Framework Paper

Proposal for Priority Actions in the Reconstruction and Development Process of Somalia

Water and Waste Management, Agro-Pastoralism & Forestry, Fisheries, Agro-Food

February 2007

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Foreword

The French SCAC of Somalia (Cooperation and Cultural Action Office) asked Agropolis International to prepare a framework document to support the preparatory meetings of the Xth European Development Fund. This document represents an attempt to set out a logical framework proposing elements of strategy and priority actions to be integrated in the National Action Plan of Somalia. According to the Terms of Reference, this expertise focuses on four main sectors:

- Urban Water
- Fisheries
- Agropastoralism and forestry
- Agro-food

Background

This demand came after a preliminary assessment made jointly by the United Nations and the World Bank in May 2006 (Joint Need Assessment). Some opportunities of intervention were already identified.

The sectors covered were among the priority private sectors identified by the Joint Need Assessment.

The main goals of this document are to develop more in details the various options of activities, and to structure them in potential strategies of intervention. Group of activities are identified, and, within each groups, potential activities are proposed.

Analysis or recommendations' reliability

This list of possible interventions is made to support decision - making in the field of post-war development. If considering the Integrated Project cycle Management, the expert team considers being at the stage of identification of potential actions. On this basis, prefeasibility studies should be conducted to confirm/infirm these opportunities.

As the expert team was not able to go to Somalia, this identification of potential interventions is mainly made through bibliographic evaluation.

The recommendations or the identification of group of potential activities are made on an uncertain basis and could present some misunderstanding of the current technical situation. As much as possible, these uncertainties are pointed out.

To overcome these difficulties, the expert team uses its knowledge of similar situations in developing countries or tropical environment, adapted to Somalia according to available data and information.

Using the logical framework methodology for sectorial review

Each sector presentation follows the same structure:

- Brief presentation of the sector review (main facts according to data available to the expert team)
- Presentation of the problems. As much as possible, the organisation of the problems and their splitting between problem/causes/consequences chains was done.
- Presentation of the synthesis overview of the objectives/goals

- For each identified strategy of intervention, presentation of the overall objective, the expected results and the various activities to be led to match the expected results. If identified, hypothesis and assumptions are presented. Priority actions are finally presented.

Data and information availability

Most of the information was made available to the expert team by the French Embassy. Each expert completed this documentation by using its own usual bibliographic sources and databases. As an overall point of view, no recent reliable data is available, but the situation varies according to Somali regions, their stability and the efficiency of their information systems.

Most of the information used is estimation of the situation from second hand data made through direct experts field missions (mainly teams of International organisation / consultants - see Joint Need Assessment).

This document has been written by a group made up of experts from different fields and institutions under the overall supervision of Agropolis International.

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1. Introduction

1.1. Country profile

Somalia occupies a land area of 637,600 square kilometres in the eastern "Horn" of Africa and has the longest coastline in Africa (3,025 km). The climate ranges from arid to semi-arid. Most of the country receives less than 500mm of rain annually, but rain patterns shows some important regional variations: large areas in the northeast and central Somalia receive as little as 50 mm to 150 mm. North-western highlands and the southwest receive 330 mm to 500 mm. In its physical setting, Somalia is a land of limited contrast: it comprises a maritime plain alongside the Gulf of Aden and Indian Ocean and plateaus up to the north-western range. South-western Somalia is dominated by the country's two permanent rivers – the Jubba and the Shabeelle – whose sources originated from the Ethiopian highlands. The Jubba River enters the Indian Ocean at Kismaayo – the southern Somali port – while the Shabeelle does not reach the sea and lost in the sands east to Jilib.

Land use is mainly formed by permanent pastures (50%). Arable lands constitute a potentially 13% of the country, of which an estimated 20-30000 ha are irrigated. Cultivation is practised in the northwestern part of Somaliland (Hargeisa and Borama districts) and at a higher scale, in the interriver area of southern Somalia. Forests and woodlands cover 12% of the country, but deforestation rate is high.

From a cultural and linguistic perspective, the Somalis speaking people belong to the East-Cushitic family (including Oromo, Saho, Afar and Rendille). They live in the Republic of Djibouti, the South-eastern regions of Ethiopia, and in Northern Kenya.
In the Republic of Somalia itself (including the autonomous regions of Somaliland and Puntland), the estimated population is 7-8 million, comprising about 350,000 internally displaced persons and more than 400,000 refugees accommodated in refugee camps in the neighbouring countries. Many more fled the country these last fifteen years of warfare, to form Diasporas communities in Europe, North America and in the Gulf countries.

1.2. Social Background

The Somali Republic was formed in 1960, through the unification of the British Somaliland protectorate and the Italian Somalis colony. For a long time after independence, Somalia was regarded as a model of nation state in Africa, due to its relatively linguistic, cultural and religious homogeneity. An ideologically framed charter distributes the Somalis people into two main groups – *Sab* and *Samaale* – comprising six major family clans: *Darood*, *Dir*, *Hawiye*, *Isaaq* (the *Samaale* entity), *Digil* and *Rahanweyn* (the Sab group). Others social minorities groups were incorporated into the national frame, while located at the margins of the social, economical and political life of the country. For although Somalia's population was viewed as "ethnically" more homogenous than those of most contemporary States (in Africa and elsewhere), it has important social, economic and "race" cleavages that have been historically and politically shaped, and that surfaced following the State collapse in 1991.

The first obvious division line in Somali society is between clans which members are bound by genealogical ties. Genealogy constitutes a central feature of the Somali social system. The traditional social structure was characterized by competition and conflict among descent

groups, especially for access to natural resources (pastures and wells in the pastoral sphere). While armed conflict became rare during the two decade following independence, Siyaad Barre's regime incited and inflamed clan rivalries to divert public attention from his increasingly unpopular ruling of the country. Since the collapse of the State, clashes between clans changed in terms of scales due largely to the high level of casualties and capacity destruction of modern weaponry. Clashes showed a changing face as well, because the current stakes do not only concern grazing rights, but also the control of harbours, airports, trade routes, valuables lands or properties and foreign aid deliveries.

A second major division is between nomad pastoralists and settled farmers. Recent surveys showed that nomadic pastoralism still involved about 50% of the population, while the livestock sector accounted for 44% of the GDP (Gross Domestic Product)[1]. As an EC recent report concludes "*nowhere in Africa is nomadism of greater significance than in Somalia*". Due to the arid conditions of the country, nomadic pastoralism used to be the prevailing economic activity among *Samaale* clans of northern, central and southern Somalia, while *Sab* groups were mainly involved in agropastoral and cultivation activities in the interriver area.

The areas between the Jubba and Shabeelle rivers indicate a higher level of social heterogeneity than in other parts of Somalia. Some groups (the majority of *Rahanweyn*) are engaged in various form of agropastoralism, combining transhumant herding of camels, cattle, and small stock with sedentary cultivation of rain-fed sorghum, maize and legumes. Along the middle and lower Jubba, most of the local farmers were descendants of former slaves who escaped the Zanzibar's plantations in the latter nineteenth century or migrated there following the colonial abolition of slavery in the early twentieth century. These communities from Bantus origins and collectively known as the *Gosha*, has been augmented in the post independence decades by pastoral Somalis who, after losing their animals to drought or disease, has been encouraged by governments to settled and take up farming activities. Farmers number an estimated 14% of the population.
Because of its specific social fabric it was in the settled farming areas of southern Somalia that the struggle was most intense and disruptive for ordinary life of the local people.

Somalia witnessed also changes in terms of a growing urbanization. Urban dwellers represent an estimated 36% of the population. Traditionally oriented toward business and administrative activities, Somali cities shelter a strong population of returnees: Hargeisa (Somaliland) and Bosaso (Puntland) host a high number of internally displaced persons – 40,000 and 60,000 respectively. Mogadishu, despite insecurity, has attracted the largest displaced population at an estimated 200,000 – 300,000.
Towns host too a large section of an unemployed and disenfranchised youth, which have been a target recruitment for armed gangs and militias in Mogadishu and south central Somalia towns.

[1] ICRC *Livestock Study in the Greater Horn of Africa, 2004. Somalia Country Profile*. Nairobi 2005. See also *Somali Joint Needs Assessment. Productive Sector and Environment clusters Report*. 2006

1.3. Political overview

1.3.1. From rise to fall of the Central State (1960 – 1991)

Since its independence in 1960, Somalia knew only one short democratic period, which ended in October 1969, following the military coup perpetrated by the General Siyaad Barre. The military coup that ended the democratic regime defined its action as a Marxist revolution, not only institutionalising a new political order but also proposing the radical transformation of Somali society through the application of "scientific socialism". However, the regime turned to be a highly authoritarian military regime that ruled the country for 21 years.

The war with Ethiopia over the disputed Ogaaden region (1977 – 1978) concluded with the defeat of Somali troops. The defeat was also the starting of a long period of internal turmoil that leads to the destruction of the Somali State. For the end of the seventeen's, the post war consequent refugee influx forced Somalia to depend for its economic survival on humanitarian aids. On the political domestic front, the lost war produced a national demobilization. Organized opposition groups began to emerge, and in dealing with them Siyaad Barre intensified his political repression, using imprisonment, torture, summary executions of dissidents and collective punishment of clans.

Faced with shrinking popularity, the military regime unleashed a reign of terror against the population especially in areas where a growing domestic resistance was organised: notably against the Majeerteen clan in north-eastern Somalia and Isaaq clansmen of north-western. The first two clans based oppositions groups emerged at that time: the *Somali Salvation Liberation Front* (SSDF) in 1978, recruiting mainly among Majeerteen clansmen; and the Somali National Movement (SNM) formed in London in 1981 by Isaaq clansmen.

In May 1988, the SNM launched co-ordinated attacks on the northern cities of Hargeisa and Burao and succeeded in temporarily routing Siyaad Barre's forces. The government response was brutal: artillery and aircraft bombed the major towns into rubble and forced the displacement of roughly half a million refugees across the border into Ethiopia. Isaaq dwellings were systematically destroyed, while their settlements and water were extensively mined.

The formation in 1989 of southern Somali factions – the Somali Patriotic Movement (SPM) and the United Somali Congress (USC)[2] – provided new military fronts against the military regime. In January 1991, USC advances in and around Mogadishu forced Siyaad Barre to abandon the capital. The SNM staged its final offensive in the northwest and self-proclaimed an independent Republic of Somaliland few months later (May 1991), restoring the boundaries of the former British Protectorate.

The structure of the central State formed in 1960 collapsed in 1991.

[2] Both organisations were clans based armed oppositions: SPM recruiting mainly among southern Ogaaden clans, and USC among south-central Hawiye clans.

1.3.2. UN/US interventions in Somalia (1992 – 1995)

The Hawiye based United Somali Congress which overthrew Siyaad Barre in the battle of Mogadishu, soon dissolved into factional disputes. One faction appointed Ali Mahdi Mohammed, belonging to the Abgaal sub-clan of Hawiye as interim president of the Somali Republic. The military leader of USC, General Mohamed Farah Aideed belonging to the rival Habr Gedir sub-clan of the Hawiye opposed Ali Mahdi nomination. In the Mogadishu area, each of the opposition groups drew support from a particular clan or sub-clan, and each resorted to arms to further its claims. Serious fighting in Mogadishu began by mid 1991, and intensified the following months.

The situation in the country as a whole deteriorated rapidly, as a result of the civil war combined with a drought in central and southern Somalia that left hundreds of thousands starving, by mid 1992. Beyond Mogasdishu, the coastal regions of Brava and Merca, and the interriverine agricultural regions were systematically looted and razed to the ground as the contending factions battled for resources and power. The outcome of the civil war in Somalia's south central regions was the destruction of the agricultural belt occupied by the Rahanweyn, Digil, Gosha, and other minority clans and communities. The war in the south resulted in a huge displacement of people, an estimated third of the entire southern population.

The international response was slow in coming. UN peacekeeping forces had arrived in Somali in April 1992, as part of the United Nations Operation in Somalia (UNOSOM). Their role was limited to overseeing a ceasefire between the different clan factions. Only a handful of aid agencies had remained in the country after Siyaad Barre's departure from Mogadishu in 1991. As a result, extensive knowledge of local conditions was lacking in the humanitarian agencies when emergency food flowed into the regions, resulting in the de-stabilisation of food markets. Delivering humanitarian aid to the affected regions was particularly difficult for the agencies involved, many of which were forced to pay armed militia to distribute relief. This in turn encouraged a war economy, which quickly became dependent upon overseas cash flows and personnel. The concentration of aid in and around Mogadishu drew increasing numbers of displaced people from rural areas to the relief camps in the city.

The deteriorating situation inside Somalia led US President George Bush to intervene in December 1992. Operation Restore Hope committed 28,000 US troops to the US-led United Nations Task Force (UNITAF). What may have begun as a humanitarian operation to ensure that food supplies reached the victims of famine quickly degenerated into an exercise in 'nation-building' under UNOSOM II in May 1993. This succeeded in alienating Somalia's powerful warlords. The spectacle of a dead US soldier's body being hauled through the streets of Mogadishu rapidly led to the decision to withdraw US troops from Somalia. US withdrawal from Somalia was completed by March 1995.

1.3.3. Regional fragmentation (1995 – 2006)

After the withdrawal of international troops in 1995, Somalia as a whole did not back into civil war. In different areas of the country occurred some process of stabilisation. Regional administrations emerged to provide a degree of security and administration in several areas,

notably Somaliland (northwest), Puntland (northeast) and the Bay/Bakool regions (southwest).

During this period, various attempts at reconciliation met with lesser or greater measures of success. A reconciliation conference in Djibouti established a "Transitional National Government" (TNG) in 2000, but this latter failed to assert its authority beyond small pockets in Mogadishu.

Some others attempts led to the formation of the Transitional Federal Government (TFG). The TFG was formed in late 2004 – early 2005, following two years of negotiations in Kenya, led by the Inter-Governmental Authority on Development (IGAD). On October 2004, the newly-formed TFG elected Abdillahi Yusuf as President, who appointed Ali Mohamed Geedi, a veterinarian, as prime minister. Because of reigning insecurity in Mogadishu, the TFG relocated in the town of Baidoa. The TFG had little control over the country, until January 2007.

1.3.4. Toward stabilisation?

In 2004, the Sharia's law oriented Islamic Courts in Mogadishu, began to establish a new political umbrella organisation called the Islamic Courts Union (ICU). Previously organised to provide charities services and Islamic teachings, these courts played a growing role in the restoration of some level of order and law in the capital.

To prevent their political raising, a coalition of secular Mogadishu warlords wad formed, with US financial support: the so-called "Alliance for the Restoration of Peace and Counter-Terrorism" (ARPCT). In the first half of 2006, heavy fights occurred in Mogadishu, which led to the victory of the Union of the Islamic Courts.
The UIC succeeded in capturing Mogadishu and expand beyond, toward middle and lower Jubba. By November 2006, it has assumed a control on almost all major towns of South Central Somalia, except Baidoa where the TFG was entrenched.

In December 2006, a fight began around Baidoa, confronting the UIC against the TFG backed by Ethiopian troops. Within a few days of lighting offensive, the latter defeated Islamists fighters and recapture all the territories previously conquered by the UIC.

On the early days of 2007, the Transitional Federal Government settled for the first time in Mogadishu, and called for the disarming of militias.

1.4. Economy

Before the collapse of the State, Somalia was a debtor nation dependent on foreign aid and the export of a few basic commodities (bananas and livestock) for hard currency. Its rural economy was not supported by efficient policies and its rural administration experienced increasing bureaucratization.

Nowadays, the productive sector of the economy is still dominated by agriculture which account for the highest contribution to the GDP, for the main export (mainly livestock), and

for the most employment. Most of the challenges faced by these productive sectors are reviewed in the following report.

Beyond the rural sector, it should be noticed that despite the impact of more than ten years of self-inflicted tragedy and chaos, the Somali population have not lost their sense of entrepreneurship and business initiative. There are significant private investments in commercial ventures, including in trade and marketing, financial services (in the form of the remittance system), transport, constructions and hotels. Some new economic sector developed such as the telecommunications sector which is highly developed and privately owned.

Local initiatives led to impressive achievements to promote services in areas such like health and education, notably in the stabilized areas of Somaliland and Puntland. These initiatives are funded by the large remittances from the Diaspora. Remittances have been estimated to amount about US$ 500 million annually[3]. The Diaspora hence continues to play a key role in helping the Somali economy as well as in providing a main income for households.

1.5. Millenium goals and development agendas

In the absence of a functional national authority in Somalia and of reliable socio-economic data, Somalia has not been ranked in the UNDP global Human Development Index (HDI) since 1997 and is instead included in the list of the countries for which statistical data are considered inadequate for constructing the HDI.

According to main aid agencies, the goal of eradicating extreme poverty and hunger, while difficult, is not impossible to achieve.

Apart from the most immediate cause of food insecurity – natural hazards and armed conflict – Somalia is confronted with chronic livelihood crisis: "*intense population pressure on natural resources has resulted in increasing rural-urban migration; unsustainable exploitation of a fragile ecosystem leading to environmental degradation; low productivity agriculture and neglected pastoralist patterns of living. Agricultural resources are exploited well below their potential. Performance is hampered by the displacement of farming communities; poor farming techniques knowledge, poor access to agricultural inputs and services; dysfunctional infrastructure (particularly irrigation infrastructure) absence of processing facilities; and limited market access.*"[4]

While the livestock export sector indicates an amazing resilience, nomadic pastoralists have to deal with a combination of constraints mixing recurrent climatic hazards and political instability that have weakened their traditional coping mechanisms.

War casualties went on far reach on the farming areas of Jubba and Shabeele where indigenous farmers were expelled by warlord militias. Access to land rather than availability remains the major problems faced by these vulnerable communities. For the key to any rebuilding of the rural economy lies in ensuring rural producers to the resources they need to be productive.

[3] See Ismail I. Ahmed, "Remittances and their economic impact in Post-war Somaliland", in *Disasters*, 2000, 24 (4): 380-389.

[4] Quoted from Annual Operation Review of Cooperation between the People of Somalia and the European Community in 2004.

Beyond the productive sectors, Somalia shows poor records in achieving MDG in the field of education and health.

2. Productive Sectors

2. 1. Water and Waste Management

2.1.1. Sector review

Very little information is available concerning the water sector in Somalia. However, the regional situation is as follows:

- In Somaliland (arid climate), piped water trucks supply 45% of the urban population. 45% of the rural population has access to water catchments. Water requirements for the city of Hargeisa is estimated at 12,000-20,000 m^3 per year. The output capacity is estimated to be 6,000-8,000 m^3. Four private companies treat public water and sell it. However, there is a good public / private partnership.
- In Puntland (arid climate), major water shortages occur. In Bossaso, 60% of the population use water from 500 shallow wells with questionable quality. Basic institutions are in place which lack financial resources but have sufficient strong public/private partnership.
- In South-Central Somalia, international aid is only available for individual projects in safe areas (drilling of boreholes, mini water supply systems).A good example of public/private partnership takes place in Sowhar with an adequate water supply for 30,000-35,000 inhabitants.
- In Benadir Region (greater Mogadishu), no major shortages occur. Indeed, 550,000 persons have direct access to water and 650,000 have access thanks to private vendors. Many private companies are not regulated. As a consequence, water quality may be drinkable or toxic. There is an important need for developing regulatory and planning frameworks.

2.1.2. Identification of problems

Specific problems in rural areas are as follows:

- Access to agricultural land and water points are one of the most critical issues in rural areas.
- In irrigated lands, there is a need for rehabilitation of irrigation channels.
- There is a contamination risk in villages where water is available both for humans and livestock.

Drilling new boreholes is one solution, but this leads to several difficulties:

- Deep water needs deep boreholes.
- Lack of pumps reduces the access to water.
- Lack of adapted rotating drill equipment.

When there is no control of catchments, the resource is wasted.

Specific problems in urban areas are as follows:

- Civil war has led to an increase of 300-500% of urbanized population without adequate human infrastructure development. As a consequence, more and more people live in camps.
- Urban space is more or less controlled by clans.
- Sixty percent of the urban population is unemployed or under-employed.
- Clean water is one of the most critical resources in any urban area.
- Only 30% of the entire urban population has access to clean and sustainable water.
- Municipal institutions and management systems have inadequate capacities in Somaliland and Puntland and are largely absent in South-Central Somalia.

Urban water

Basic investments by international communities (e.g. UNICEF and the European Community) have only been made in politically stable areas (Somaliland and Puntland). But due to the urban population increase, these investments have been way below the real needs for piped water or other adequate water supplies.

Water sources are inadequate (quantitatively and qualitatively speaking). They rely mainly upon boreholes and unprotected shallow wells. Shallow wells are polluted by outdoor latrines and hence cholera is frequent.

There is a lack of geo-hydrological surveys.

There is a lack of drilling capacity, pumping capacity, etc.

A small percentage of water is distributed by public or private pipes whereas most is delivered by collecting wells and boreholes operated by private suppliers, water kiosk vendors or by local delivery via water tank trucks, donkeys or carters. This leads to extremely diverse water prices and inequality (the most expensive water is for the poor with the exception of a few good examples of public / private partnership).

Only Somaliland and Puntland have established Water Agencies that control some investments in the water sector, but there is no clear division of responsibilities between these agencies. Enforcement of decisions and control of activities are still non-existent.

Control of the private sector requires careful management to avoid local tension.

Solid and Liquid Waste Management (SLWM)

The general situation is catastrophic:

- Presently, no national, regional or municipal waste management policies or institution exist at all.
- Local authorities face the most urgent financial needs without any cost-recovery system (inadequate taxation system that is not integrated into the water tariff).

- Actions in that field rely mainly upon international assistance and local Non-Governmental Organizations (NGOs).
- The already poor natural drainage systems have been blocked by solid waste deposits or uncontrolled construction, leading to pond accumulation and flooding (these problems are exacerbated by uncontrolled urban growth).

Solid wastes

In Somaliland and Puntland, individuals (generally poor Internally Displaced Persons and women) collect solid wastes directly from households for a fee (with wheel barrows). They transfer it to local collection sites (public, private and local NGOs) and uncontrolled dumping sites. The absence of coordination and regulation of solid and liquid waste disposals has led to a multitude of illegal dumping sites. This is a direct cause of massive sanitary problems. It should be pointed out that the poor working in this field should not be excluded from their income source.
Some good examples of public/private partnership exist: localized cost-recovery systems for SLWM in market places or municipal clean-up; awareness campaigns in collaboration with the private sector and NGOs (women and youth organizations).

In South-Central Somalia, the practice of collect, burn & bury is generally done in shallow pits in housing neighborhoods, leading to the same sanitary situation than in Somaliland and Puntland. International assistance has a bigger role in that region.

In all regions, dumping site locations are not determined according to hydrological and geological surveys (e.g. deposit in dry river beds...). Another general problem is the widespread waste of plastic bags that is turning into a major waste management problem. Several international NGOs are operating in major towns on setting-up low technologies SLWM systems, by linking all stakeholders to address immediate practical needs (situation analyses and pilot SLWM projects).

Liquid waste sanitation

In Somaliland and Puntland, dry pit latrines are generally dug as soon as the previous one is full. This lack of location planning creates heavy groundwater contamination.

Liquid waste collection is rare (only 2% of waste waters are discharged out of agglomerations). Direct discharge in the streets creates health hazards particularly for children. Septic tanks are rare and most of them are not managed. In very few cases, waste water is collected by truck. Even in that case, the low demand isn't met by the lack of specialized tanker trucks.

There is a lack of sanitation facilities (e.g. septic tanks) in community areas (markets, slaughterhouses, schools, hospitals...), even if they are equipped with piped water.

In Mogadishu, a very small extent of the pre-war sewage system is still functioning. The rest is collapsed or obstructed and there is an urgent need for a more cost-effective liquid waste disposal.

2.1.3. Objectives

Urban Water: Implementation of regulatory mechanisms and assistance measures relieving the State of its obligations

Such measures could include free water policies towards the poorest.

Transitional Federal Government (of Somalia) has to clarify the water sector institutions' role and prepare federal regulations.

Existing or emerging ministerial and public water agencies could coordinate regional and interregional water policy preparation, together with regional water and sanitation committees. This should constitute a legal and an institutional framework for water services development and for needs and priority analyses.

Municipal authorities should lead in local policy framework, service quality control and service development planning.

Sectorial ownership and responsibility should continue by various public and private stakeholders, allowing rapid development and adaptation if the regulatory framework is clearly defined. Particularly, public/private partnership should be supported through financial and management assistance for private entrepreneurs and technical assistance and training for private or public operators and public controllers.

Technical implementation of every water development project should systematically include international organizations and NGOs which have considerable local experience and knowledge.

Solid and liquid waste management (SLWM)

International financial assistance should roughly cover half of the needs for initial SLWM. Public/ private partnership should allow further expansion through cost-recovery policies.

Municipal authorities need support in development and enforcement of local and regional waste policies. This should lead to priority needs and service development assessment (e.g. disposal sites and service for the poorest), and to the establishment of revenue systems for the parts that cannot be handled by recovery based public/private partnership.

There is a basis of the private sector in Somaliland and Puntland, which has the ability to cover part of investment and functioning costs for low-technology collection systems. But it needs improved technical and management capacity support.

2.1.4. Intervention Strategies / Logical Framework

Global objective 1: *Hydrological and hydro-geological data collection*

Expected results

- In order to make it functional for urban policy developers, improvement of the Somalia Water and Land Information Management System (SWALIM, FAO) is needed (Water Master Plan for Somalia and Water and Sanitation Strategy for Somalia, SACB - WSISC, 2004 - 2008)

Activities

1. Consulting by Geographic Information System (GIS) management consultants and cross-referencing with on-site information retrieval.
2. Ensuring system durability.

Hypothesis

- Agreement with FAO and transitional federal government of Somalia.

Priorities

- Providing urban stakeholders with urban maps, containing natural surface drainage system conservation areas, zoning as well as areas subject to flooding.
- Street planning is urgently needed allowing further installation of logical pressured piped water networks and gravitating sewer systems networks as much as possible.
- Enforcement of local policy-makers' decision.

Global objective 2: Increasing proportion of population with access to safe drinking water

Expected Results

As stated in the WHO Millenium Developpement Goal, the goal is to halve the proportion of people without access to safe drinking water by the year 2015. Expected results are as follows (JNA ICR/ Somali Joint Needs Assessment Infrastructure Cluster Report):

- Number of people with access to safe drinking water
- Reduction of distance that people travel to get safe water - and time spent
- Expansion of water supply networks
- Price of water - especially for the poorest (affordability)
- Reduction of water born diseases
- Participation of women and minorities in the work force and the management of water supply systems

WHO Millenium Developpement Goal states that the higher benefit/cost ratio is obtained by systems that save time to access safe water and by systems ensuring water decontamination on-site.

Activities

JNA ICR has financially evaluated the main activities (see Annex 1).

1. Strengthening local capacities in administration and technical efficiency (including NGOs); establishing good practices of public/private partnership.
2. Ensuring sustainable capacity through self-sustained financial capacity (adapted tariff policies).
3. Supporting collectivities in direct infrastructure investments.

Technical choices must be made with NGOs that have important practical knowledge about local implementation. For instance, during the 2006 drought period, approximately 10 NGOs, UNICEF and IRCC (International Red Cross Committee) conducted the following activities:

- Maintenance of operational water points (16)
- Rehabilitation of water points (34)
- Water trucking (22)
- Water treatment (28 autonomous skids concerned)
- Sanitation (4)
- Hygiene education (6)

Techniques for drinking water treatment must be adapted to the quality of the resource. Indeed, surface water is likely to present a different and much more important contamination than underground water. Somalia presents a primarily formed relief of plains and very high plateaus. In the North, precipitation is not very abundant and the climate is semi arid to arid. The South-East part of the country receives more precipitation and the Jubba and Shabelle rivers are used for irrigation. The long coast of more than 3,000 km skirts the Gulf of Aden to the North and the Indian Ocean to the East. Northern Somalia can primarily exploit the semi-deep resources whereas Southern Somalia can use surface resources. In addition, sea water can constitute an alternative drinking water resource but the process of desalinization requires high technology and is very expensive.

The lack of resources in Northern Somalia and the four season succession (two wet and two dry seasons) leads us to propose two axes of exploitation and resource treatment adapted to the Somali context: rustic and more conventional processes.

- <u>Rustic processes for water catchments: easy to implement and adapted to nomads' land and pastoralism areas</u>

  - *Rain water collecting tanks*: The cistern use is appropriate for the inhabitants of areas where subsoil water is inaccessible. Water can be collected directly by the cistern or after streaming on the roof of the dwellings. The rain water collected that way presents a certain degree of pollution and the cistern have to be equipped with a separator which will eliminate the first collected water. The cisterns can be equipped with a sand

filter which will retain the suspended solids. They are made out of stone, brick or concrete, concrete proving to be tightest.
Ten millimeters of rain/m^2 provide 8 liters of water if account of evaporation is held. North receives 50 to 150 millimeters of water per year; one can collect from 40 to 120 liters/m^2/year. This water must be treated by chlorine with ready - to - use pills.

- *Atmospheric humidity catchment*:
  - Fog captors: In arid areas bathed by coastal or mountainous fog, water can be collected thanks to polypropylene collectors. Every net is tended between two posts at 2 meters high above ground where the fog is the most humid. Water drops are formed on net meshes and fall into gutters which supply a tank.
  - Dew captors: The principle is based on the atmospheric humidity condensation by night radiation on a polyethylene support making possible the cooling increase of the support. The slope of the structure around 30 degrees allows a better resistance to the wind. One system of 30 m^2 can collect 3 to 4 liters of water per day.

- *Water ponds and collecting reserves*: They can provide an important water reserve under certain conditions such as protecting the catchment's area from human or animal pollution with fence installation, ensuring enough volume for the water decantation and treating this water before its use.

- *Wells, springs and infiltration galleries*
  - Wells: This kind of resource water is highly susceptible to contamination. It has to be protected (i) by locating the well far from possible sources of pollution, (ii) by replacing the well lining seals by at least 3 meters in order to take into account the underground flows, (iii) disinfecting the fore peak by washing the lining with a chlorine solution (50 grams of lime chloride in 100 liters of water), (iv) treating the water in order to obtain a concentration from 50 to 100 milligrams per liter (and it has to rest at least 12 hours), (v) pumping water until obtaining a low chlorine odor (residual free chlorine of 0,2 milligrams per liter).
  - Springs: It is necessary to protect them by excluding any animal or dwelling from a circular zone from 30 to 90 meters around the source. The installation of a collecting system protected from the light avoids algae proliferation.
  - Infiltration galleries: They are horizontal wells carried out in gravel pockets around the water points. Water is filtered naturally if it is located more than 15 meters from the river bank. One trench or gallery trench in the aquifer makes it possible to emerge using a filter pipe leading to one cover or a tank and permit to collect important quantities of water.

- <u>Conventional processes for water treatment in residential areas near the Southern rivers</u>

According to its origin (surface, deep), the water will require pretreatments to eliminate elements (large objects, iron, manganese...).

- *Grids:* A system of grids eliminates large objects (sheets, branches...). The space between grids (20 to 40 mm) must be selected according to the elements to retain. Speed of water in the channel will be 0.6 to 0.7 m/s.
- *Washing and desanding*: Works of static decantation retain the settleable solids (sand, gravel, clay...) contained in surface water (river...). The work consists of widening the channel of arrival or by a rectangular settler. In this case, the speed of water is calculated to be lower than the decantation speed of the particles to retain. In general, the speed of water is at least equal to 0.3 m/s and the diameter of the particles selected equal to 200 to 300 micrometers.
- *Coagulation-flocculation*: Coagulation-flocculation is an essential stage for water which contains solids in suspension after pretreatments. The stage of coagulation requires an addition of coagulant like ferric chloride or alumina sulphate coupled to a strong agitation. Agitation is obtained by flash mixers, pipes of injection or conduits with wings, propellers or plates.
  The doses of coagulant are a function of the chemical reactions of iron or aluminum with stock solutions of iron and aluminum from 100 to 200 grams per liter.
  For water with organic matter, 1 mg of Aluminum and 2 Iron mg per mg of DOC (Dissolved Organic carbon) are advised. Even proportioning is also advised for the concentration in suspended solids.
  The agitation measured by the velocity gradient must correspond to values of 100 s^{-1} in the phase of coagulation and 10 with 100s^{-1} in the phase of flocculation. During the phase of flocculation, the polymer addition allows the agglomeration and enlargement of flocks formed during coagulation.
- *Solid-liquid separation*: When the concentration in suspended solids of raw water is important, a stage of separation is necessary after coagulation-flocculation. This liquid solid separation can be done in circular or rectangular conventional settlers with speeds of the liquid phase not exceeding 2 meters per hour.

  Other processes of separation (settlers with sludge bed, sludge recirculation, lamellar systems or floats) can intensify the process by using speeds of the liquid phase up to 10 meters per hour.
- *Filtration:* This stage is practiced according to the process of filtration in the mass on a porous sand bed whose granulometry ranges between 0.8 and 0.12 mm. For water containing less than 30 mg per liter, filtration is enough. For water containing more solids in suspension the stage of separation is essential before filtration. This stage can be reinforced (2 settlers) for values of suspended solids higher than 1.5 grams per liter.
  If water contains algae or plankton, a stage of oxidation with Chlorine or Ozone is necessary after pretreatments. In the presence of adsorbable elements (odor, color, pesticides...), one stage of contact with activated carbon is then necessary.
  This takes place during the stage of coagulation-flocculation with the addition of an activated carbon powder (up to 25 g/l). A supplementary stage consists in placing an active carbon (average diameter of carbon grain from 2 to 6 millimeters) filter (height of several 10 cm) after the sand filter.
- *Disinfection*: It contributes to eliminate the greatest part of the germs, in particular pathogenic ones. The main disinfecting agent used is Chlorine (Chlorine gas, Cl_2 or Chlorine dioxide, ClO_2) respectively during 30 to 15 minutes.
  Chlorine and its derivatives have a remnant effect. Thus, their presence is essential to maintain the bacteriological quality of water in the distribution networks. Residual Chlorine must be maintained at values higher than 0.05 mg/l in the all network.

Ozone is a powerful oxidant but without remnant effect. It is used in the stage of pre-oxidation. Its role is to break the large molecules to ensure their elimination.

- *Specific treatments*: Elements like Iron or Manganese (sometimes associated) can be found in deep water. Their elimination is possible by physico-chemical techniques rather simple to implement.
  Ferrous iron is oxidized by simple aeration (about 0.14 grams of Oxygen per gram of Iron). Then, it is transformed into an iron hydroxide precipitate, eliminated in the stage of filtration (0.2 to 1 kg of Iron/m^2 of filter). If Iron concentration is higher than 5 mg/l, the stage of separation is thus essential.
  Manganese requires a powerful oxidation by Chlorine dioxide (2.5 gram of ClO_2 per gram of Mn^{2+}) or by Ozone (0.9 ozone gram per gram of Mn^{2+}).
  Potassium Permanganate can be used (1.9 gram of $KMnO_4$ per gram of Mn^{2+}) in liquid form easier to implement.

- Other processes

  - *Water desalination*: For countries with a large coast, sea water desalination (35 g/l) or brackish water (5 g/l) can be an alternative to water resource. Processes used are highly energy consumer, except if solar energy is realizable. There are three processes:

    - Distillation is a strong energy consumer process. A solar energy system can provide weak water quantities.

      Flash distillation process makes possible the reduction of the necessary energy to reach boiling and to reduce the cost of the process. In large installations, costs get lowers.
    - Reverse osmosis process is energy consuming. It is based on a pump- enforced separation through a membrane.

    Electrodialysis process: the separation is done by the use of an electric field supporting the ionic transfer of compounds through charged membranes.

  - *Autonomous processes supplied with electric generators and solar panels*:
    - Ultra-source system: 3 to 15 m^3 per hour
    - Skids: 20 a 150 m^3 per hour.

Global objective 3: Increasing proportion of population with access to solid and liquid wastes management systems

Expected Results

- Increased number of people deserved
- Reduced diseases
- Increased length of functioning sewers

Activities

JNA ICR financially evaluated the main activities (see Annex 1).

1. Strengthening capacities of local administration and technical efficiency (including NGOs), and implementing good practices regarding public/private partnership.
2. Ensuring sustainable capacity through self-sustained financial capacity (water-based taxation and transfer).
3. Helping collectivities in direct infrastructure investments.

Technical choices have to be made with NGOs that have important practical knowledge about local implementation.

Hypothesis

- Coordination with International organizations and local NGOs

Priorities

- Supporting septic tank installations for community areas (markets, slaughterhouses, schools, hospitals.
- Supporting establishment of appropriate liquid waste collection management (specialized tanker trucks, controlled dumping or treatment sites)
- Supporting experiments of liquid waste anaerobic storage followed by treatment with rustic processes:
  - Direct land spreading on adapted sites (e.g. oil palm- tree cultures on permeable, sandy soils with low or no groundwater table)
  - Composting units (composting by mixing with vegetal, wood industry or vegetal food industry by-products, or by mixing with pre-treated solid urban waste)

Global objective 4: Promoting and supporting legal, regulatory and contractual frameworks' enforcement for water and waste management

Activities

See Annex 2 for JNA ICR objectives and financial evaluation.

Hypothesis

- Coordination with International organizations (Water and Sanitation Strategy for Somalia 2004 - 2008 (SACB-WSISC), Transitional Federal Government (of Somalia) and local NGOs

Priorities

- Coordination at central, regional and local levels
- Enforcement of Regulatory and local management capacities
- Spreading of successful public/private partnerships and good practices definition (contractualisation and objectives definition)

2.2 Fisheries

2.2.1. Sector review

Fisheries resources

Main source : Large Marine Ecosystem (LME) Somali Coastal Current website (http://na.nefsc.noaa.gov/lme/text/lme31.htm#fish)

- **Large pelagic resources**
  Somali waters are part of a large marine ecosystem (Somali coastal current) where a major migratory tuna stock is located. Large pelagic fishes can be caught all year long, but the highest fishing period starts in August through November. This stock is quite well known by the European distant fishing fleets which follow it during its migration in the Mozambican Channel and Seychelles EEZ (Economic Exclusive Zone, see fishing fleet activities - foreign distant fleet activities) (Fonteneau, 1997). Other large pelagic fishes can also be caught, such as kingfishes.

- **Small pelagic resources**
  Somali waters have abundant stocks of small pelagic fishes, due to a local coastal upwelling: herring, sardines and anchovies.

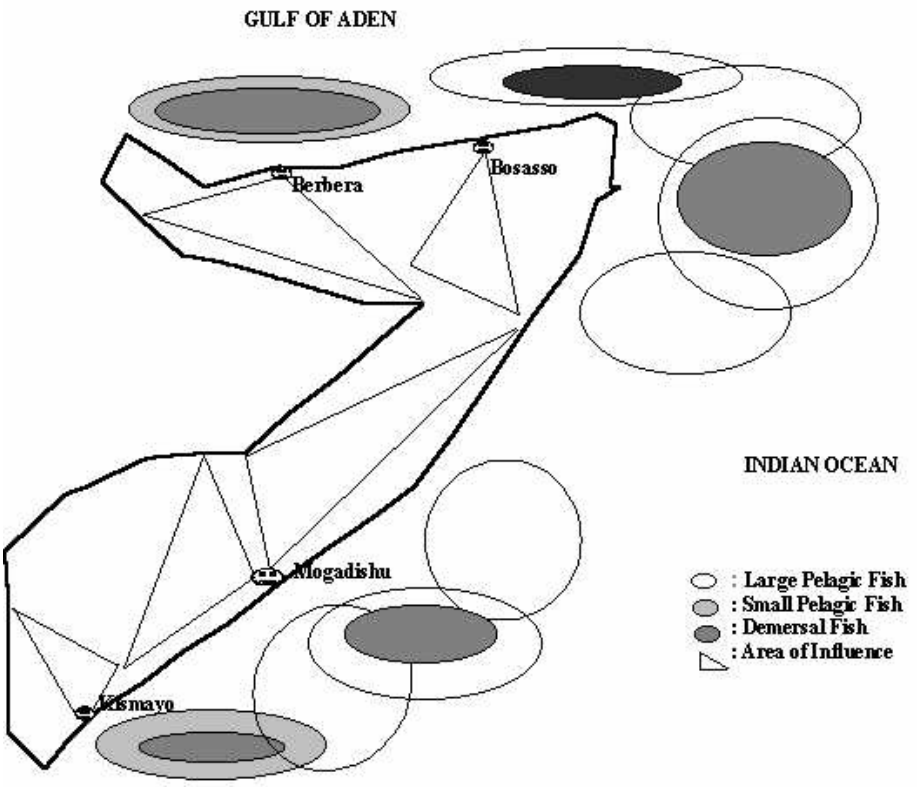
- **Coral reef resources**
  Very little recent information is available, but strong biodiversity is reported. No detailed data are available.

- **Crustaceans**
  3 main types of species are reported:
  - Coastal inshore lobster and crabs
  - Deep sea lobster
  - Coastal prawns, at the Kenyan Border

- **Groundfishes**
  Mainly located in the South Central area, a potential stock exists, but they face strong pressure due to the unregulated state of the whole Somali fisheries. The usual diversity of tropical demersal fishes is represented. Sharks and rays are also part of these catches.

- **Fishing areas and Somali EEZ**
  The estimation of the share of the whole Somali EEZ (Exclusive Economic Zone) between the three sub-regions is as follows (Van Pellekaan *et al*., 2006 - appendixes):
  - 8 % Somaliland
  - 47 % Puntland
  - 45 % South Central

Map 1: The main fishing areas in Somalia
Sources: http://www.geocities.com/somali_fisheries/illfishing.html, Musse G. H. & Mahamud H. Tako, 2001.



State of fishery exploitation

FAO estimation

The latest available catches estimated data are the same since 2001 for the Somali fishermen. They are presented in table 1.

Table 1: Estimation of catches in 2001

Type of fish	Somali catches estimation (metric tons per year)
Cephalopods undetermined	550
Marine Fish undetermined	26,300
Tropical spiny lobster	450

Source: FAO, FISHSTAT, Capture production 2004.

The data quality is poor. Some estimation ranked up to 29,000 metric tons of marine fish catches in 1994. It is generally estimated in various reports to be an amount of 20,000 tons of marine catches, which is probably underestimated taking into account the high level of Illegal unreported & unregulated fishing activities.

Approach by region

Table 2 will try to separate the review of the state of exploitation between various Somali sub-regions.

Table 2: Estimation of current yearly catches by regions

Sub regions	Estimated average yearly catches, all fleets included*	Fisheries management Status
Somaliland	13 to 19,000 tons 43 % of large pelagic	Overall good opportunities, but Lobster in state of depletion (1)
Puntland	?	Illegal and overfishing by foreign fleet is suspected to be very high (1). A negative impact on the fishing yields of small scale fisheries is also suspected.
South Central	?	Deep sea fisheries face an unregulated exploitation. Off shore large pelagic fisheries decreased significantly due to the increase of piracy activities.

Source: (1) Van Pellekaan *et al*., 2006.
* These estimations of catches should be considered with the highest caution, taking into consideration the lack of relevant and useful fisheries data. It is just an estimation with a wide range of uncertainty.
Note: The latest report dealing with fisheries for Somalia, made by Van Pellekaan *et al*. 2006, presents in appendix H a table of estimation of fishery potentialities split by main sub-regions. This table should be considered with the highest caution as the hypothesis of splitting a national estimation into regional parts is not made under a scientific basis (only a ratio based upon the EEZ surface, which is not a correct halieutic criteria).

Somali fishery industry

Artisanal Fisheries

The Somali fishery industry is now composed of small-scales fisheries, operating mainly within coastal lagoons. Industrial or large-scale fishing boats are foreigners.
This sector is supposed to employ 30,000 people directly with an estimated 60,000 others on downstream activities. Major fishing activities and communities should be located on the South-Central Coast. This sector employs permanent subsistence fishermen, part time agri-fishermen and migratory fishermen. Some new-comers to these activities have been noticed, due to degrading inland conditions of agriculture (Harberd *et al*., 2006). According to the FAO (Food and Agriculture Organization), Fisheries total labour forces account for nearly 2.3% of the total national labour force (FAO, 2006).

Post-harvesting losses are a major issue, especially in respect to the conditions of stabilisation of the catches (poor cold chains, no efficient processing industry, bad practices in salting / drying process). In Puntland, these losses are reported to represent more than 60/70 % of the catches in weight (Van Pellekaan *et al*., 2006).

As an estimation of the size of the artisanal fleet, no accurate data are available.

In 1999, the Marine and Fisheries Institute stated that this number should be in the range of 900 motorised GRP canoes (Musse & Mahamud H. Tako, 1999). The lack of fishing equipment was pointed out as a constraint for the development of traditional activities. This number of artisanal fishing boats is probably highly underestimated (see below).

The FAO reported the loss of artisanal fishing boats due to the Tsunami to be 2,500 boats. Among them, around 1,330 boats were damaged in the districts of Jerriban and Eyl, and 90 in the district of Beinder Beila (FAO, 2005). These districts are located in Puntland, and were nearly the only ones to have been affected to that extent. If taking into account this number of declared affected fishing boats in the second Somali fishing area, it is highly possible that the real fishing capacity should be more than 4,000 artisanal fishing boats for the whole of Somalia.

Private sector

Very few fisheries processing companies can be mentioned. Bosasso port in Puntland used to have some processing or storage facilities (within the North East Coast Fishing company, NECFISH), but the private sector collapsed. The Puntland government is still seeking for private investors. The private sector benefited from funding from the World Bank to strengthen cold chain of artisanal products marketed in the area of Bosasso.

Various processing plants or industrial large scale fishing companies were created in the South Central region, both by local investors and various joint ventures. But none of these companies present sustainability or a long term continuity. There is no accurate estimation of the status of remaining processing or trading plants. Somalia has no accreditation of exports, neither to European markets, nor to US markets, because the overall conditions of the country and the lack of compliance with sanitary norms.

Trade of fishery products

Informal bordering trade of fishery products is reported between Somaliland and Djibouti, especially dealing with the fresh fish market (Van Pellekaan *et al*., 2006). Some fish mongers start to supply local markets with fresh fishes also, and start to prospect the Ethiopian market as well.

Local markets are reported to be insufficient commercial outlets, (Harberd *et al*., 2006), even if some valuable Fresh fish trading chains can be noticed in Coastal towns.

According to the FAO import and export database, there are very few exports and imports. Exports should range around 2,500 tons per year (3,500 US$) and imports around 115 tons. The declared value of these exports is quite low, with a unit value close to 1.5 US$/kg.

Off shore trans-shipments between IUU (Illegal, Unregulated & Unreported) fishing boats and reefers, or direct landings from IUU fishing boats operating in Somaliland waters, could target the market of rich Arabic neighbouring countries (United Arab Emirates). The potential incomes of this trade could set the fisheries industry to be one of the major contributors to the Somaliland economy, both in terms of foreign currency income and as an employer.

Fishing fleet & marine activities

Foreign distant fleet and neighbouring countries' fleet activities

- Industrial tuna purse seining

  Industrial Purse seining developed greatly in the South-Western Indian Ocean in the late 80's and in the beginning of the 90's to exploit the migratory large pelagic fish stocks.

During 5 months of the year, catches are made off the Somalia coastal area. According to IOTC database of catches and fishing efforts, the catches within the Somali Economic Exclusive Zone (EEZ) can be estimated to be between 40,000 and 45,000 metric tons per year, on the basis of 2002 and 2003 data. These catches were done by French and Spanish purse seiner fleets.

In order to compare this level of catches to other situations, the various fishing agreements negotiated between European Union and Seychelles accord fishing rights for 46,000 metric tons per year (see bibliography for website).

It can also be noted that the European fishing fleet decided not to fish close to Somali fishing grounds since 2004, since the development of piracy actions.

- Yemen

  Yemeni artisanal fishing fleets are quite present in Somalia, especially in the Puntland. They also collect and trade demersal fishes from the Somali small-scale fishing fleet to the arabic markets. Yemeni fleets are said to compete local fleets, but at the same time they offer the opportunity of a commercial outlet that local Somali markets do not offer yet. But this trade probably does not enable the Somali private sector to earn the best value for these catches.

- Kenya

  Some semi industrial trawlers based in Kenyan harbours operate in the South Central Region. These companies are supposed to be joint ventures with European investors.
  All these fleets can be considered as IUU fishing fleets, as no official fair fishing agreement bind them with official representation by a federal or regional government.

IUU: Illegal, Unregulated and Unreported fishing fleets

Somalia is infamous for its high level of IUU fishing activities. It is reported that these fishing activities could involve between 700 and 1000 fishing boats on a day to day basis off Bosasso (Van Pellekaan *et al*., 2006).

These IUU activities cause many problems: illegal and unregulated fishing pressure, use of non-selective fishing gear, shore trawling etc.

Piracy

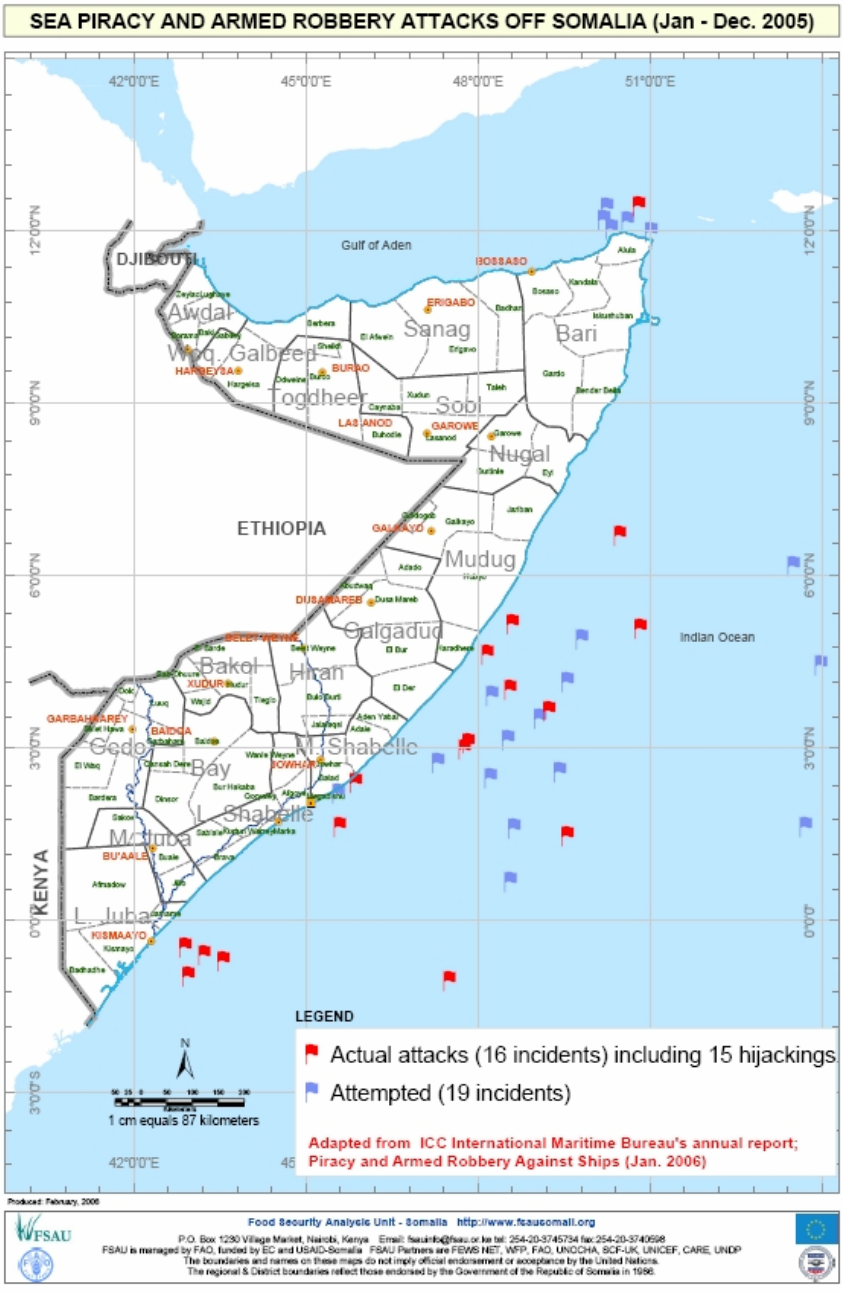
The map 2 shows the importance of the Piracy activity within the Somali EEZ in 2005. This piracy was operated from the shore by local powers. These acts often led to requests for rewards. It is noticeable that these attacks could be operated far from the shore. Fishing boats and commercial boats were mainly targeted. Information is still low on this matter, but it seems to be highly correlated with the question of political stability. The new situation in Somalia could affect these acts in a positive way

It is unclear, at this stage of a bibliographic approach, in which ways these activities are real piracy in the European understanding of Piracy.

It could be seen in a different way if taking into account the Clanship traditional organisation, with a certain type of exploitation of an affordable marine richness close to the shore, and in the same way IUU activities which plunder marine resources without any economical compensation...

One hypothesis of Somali marine piracy resolution could be a political approach to the decentralisation of official sea surveillance and redistribution of economic richness generated by licensing of foreign fishing activities.

Map 2: Sea Piracy and armed robbery attacks (2005)



Regional Fisheries Management Involvement

Two main fishery commissions include the various fishing countries and neighbouring countries of the Southern Western Indian Ocean. Somalia is involved at various levels with these commissions. Its involvement is still to be considered as low. But, in the future, it could become a strategic issue for Somalia to better participate in them, especially in the scope of fighting against IUU activities and trans-boundary fishery management.

SWIOFC: South West Indian Ocean Fisheries Commission
This commission is in the process of creation. Its Secretariat was established in 2005 in Kenya. Its goals are to cover groundfishes, crustaceans and small pelagics straddling stocks management. This Commission is not functional yet.

IOTC: Indian Ocean Tuna Commission
This Commission aims at managing large migratory pelagic stocks. It is highly involved in defining the biological status of exploited Tuna. Its scientific advice is to define sustainable fishing possibilities, especially in the scope of international fishing agreements.

Institutional organization

Ongoing Regional Administration

- Somaliland

  This region, as well as Puntland, was not affected as much as the other Southern area of Somalia. This enables both administrations to have a better overview of their local fishery industries, and also to start to implement the basic core administration. Somaliland thus presents a Ministry of Fisheries and Coastal Development. Fisheries and Coastal issues are therefore considered as a strategic priority.

  According to the Somaliland regional government, the priority of fishery development is to target both the small scale fishery sector and the large commercial fishery industry.

- Puntland

  This region also benefits from a government and a Ministry specialised in marine economy: Fishery, Port and Marine Transport. The marine environment is also considered as a strategic issue.

- South Central

  This area has not developed any regional administration due to the local political situation.

Regulations and Fishery Policy issues

- Somaliland

  The President of Somaliland endorsed a White Paper on Fishery and Coastal uses of natural resources in 2000. A Five year strategic plan has also been adopted in the years 2005 / 2006 (Van Pellekaan *et al*., 2006). This Plan mainly targeted support to the fishery private sector, and the economical environment to strengthen it, such as infrastructure.

- Puntland

  The Puntland authority is the only one reported to have tried to set up a recent regulation regarding the fishery activities. It is recorded as the "Puntland Fisheries Regulation" of April 2005, implementing a Fishery/Marine Policy and strategy (April 2004) (Van Pellekaan *et al*., 2006). This regulation seems to have never been enforced. The environmental concerns of the Ministry of Fisheries, Port and Marine Transport are also mentioned within a Environmental Change Evaluation paper from the 25th January 2006.

  Foreign fleets operating in Puntland are supposed to pay a small fee for their licensing. This amount was suspected to be far below the standard for such rights of access to fisheries.

- South and Central

  This region has not developed any regulations.

Ongoing projects

FAO, Post Tsunami support

In the field of fisheries, the FAO provided help to 2,000 targeted fishermen with cash, boat and fishing equipment (FAO, 2005). In late 2005, funds received so far have been used to:

- procure approximately US$603,000 worth of fishing gear and boats;
- carry out training programs for fishermen, focusing on fish handling and processing as well as the environment and management of marine resources and for mechanics in boat engine repair, essential to ensure sustained performance of the fishing fleet;
- prepare a Fisheries Association Statutes template– these associations will be fully involved in distribution of the boats and gear to their members and take charge of revolving funds for the maintenance of the fishermen's' equipment and further investments;
- carry out assessments to obtain a more precise idea of damage caused by the tsunami, not only in the worst affected North-eastern part of the country, but also in central and south of Somalia;
- identify suitable locations for installation of ice-making machines, critical for the preservation of fish and reduction of post harvest losses.

Agulhas-Somali Large Marine Ecosystem (ASLME) and South West Indian Ocean Fisheries Project

These projects are led at a sub-regional level and intend to strengthen trans-boundary co-operation between riparian States of the South West Indian Ocean. They are both funded by the Global Environment Facility of the World Bank. The intended co-operation is mainly in relation to scientific activities. Somalia started to get involved in SWIOFP as an observer member State.

Maritime and coastal environment

The coastal environment is quite variant from the Kenyan Borders up to the Djiboutian ones.
At the Kenyan Border, the mangrove areas are reported to be quite depleted, due to human pressure and firewood exploitation (Van Pellekaan *et al*., 2006). These areas now show salt marsh ecosystems. The impact on marine resources is unknown, but supposed to be high as these areas are usually important nursery areas for fishes, molluscs and crustaceans.

Northward, between the Kenyan border and Puntland, the coastal ecosystem is made of coral reefs and sandy beaches. The continental shelf is narrow on this coast. The coastal area is of great importance, both in terms of biodiversity protection (main endemic species are mentioned) and in terms of contribution to the life cycle of many commercial resources (nurseries).

From the Puntland to the Djiboutian border, it is a transitional ecosystem between the mouth of the Red Sea (coral reef ecosystem) to the coastal oceanic ecosystem of the coastal Somali Current.

As a matter of fact, the pressure is globally high on the whole coastline, where 55 percent of the population is located (Van Pellekaan *et al*., 2006).

Further several external threats can also be pointed out:

- The risk of large oil spillage
- A global spoilage of the coastal environment

Global International Waters Assessment (GIWA) characterizes the Somali Current LME as severely impacted economically and socially in the area of habitat and community modification, and severely impacted in the area of fisheries. (http://na.nefsc.noaa.gov/lme/text/lme31.htm#fish).

Threat of oil spillage

Somali EEZ is of a quite strategic issue. It controls one of the major oil trade maritime routes of the world. The risk of marine oil spill is potentially high.
The Mozambican Channel Riparian Countries are already involved in a regional Marpol program funded by the GEF (Global Environmental Facility) called "Western Indian Ocean Islands Oil Spill Contingency Planning".

Due to the political situation of Somalia, the country did not benefit that much from this program. In the case of the reducing piracy activity, the maritime frequentation of the Somali waters could increase, and increase in the same proportions the risk of oil spills.

Coastal environment spoilage

... due to fishing activities
IUU activities are made with no cautiousness in regards to the protection of marine sensitive areas. Coral reefs especially are reported to face long term degradations (Van Pellekaan *et al*., 2006).

... due to human settlements on the coastal area
Many uncontrolled waste deposits are reported on the shoreline, close to coastal urbanization. Waste management is highly inefficient. The various types of waste impact the environment in the long term (discarded batteries, etc.). This impacts the environment as a whole, as well as human health concerns (Van Pellekaan *et al*., 2006).

... due to upstream activities
The agricultural and global inland environmental degradation impacts the shoreline, and especially estuaries which are of great interest as nurseries for marine living resources.

... due to environmental piracy
Allegations exist regarding possible unregulated and illegal dumping of toxic wastes by foreign countries (Musse & Mahamud H. Tako, 2000). Some inland toxic waste deposits may also exist.
The lack of Somali sovereignty on its waters, and the lack of oil pollution fighting equipment is also a weakness to prevent regular marine pollution off shore (bilge waters, ballast discharges, oil spill, etc.).

2.2.2. Identification of problems

Description

The overall problem could be summarised as follows: Somali Marine Natural resources do not contribute to the local economy as much as they should or could.

Causes

Three items are the causes of the under valorisation of Somali marine resources:

- No Sustainable and fair fisheries agreements
- A Low level of national catches in regards to existing potentialities
- Market issues

Lack of fair fishery agreements
The main issue is the lack of official framework and interlocutors who could insure and warranty correct application of a fair fishery agreement. The EU purse seiners fleets could be quite interested in working under a classic EU bilateral fishery agreement, as Somali EEZ potentialities are as high as Seychelles EEZ.

Lack of Sovereignty within Somali EEZ
The feeling of uncertainty is amplified by the risk of marine piracy operated from the Somali shoreline, and of the IUU activities conducted by foreigners within the Somali EEZ. All these points deal with the problem of sovereignty within Somali EEZ, which is identified as an important problem. This lack of sovereignty is mainly the consequence of the war situation and of the clanic management of Somali Society.

But it is also the consequence of a low national budget which would enable the conduction of enforcement at sea for a regular and official government.

This lack of sovereignty is also noticed for Environmental management of the coastline. This enables all Environmental Piracy activity.

Low level of national catches in regards to existing potentialities

National catches are low for two reasons:

- Intense activity of IUU fleets which steal Somali fish without any economic compensation for the national economy and its private sector
- Actual global fishing effort probably exceeds the natural capacity of certain demersal and reef fishes and crustacean stocks

These problems directly address the question of sustainable use of marine natural resources within the Somali EEZ. This sustainable use is deficient because of the lack of a strong fishery management system, which includes both managing and enforcement capacities. This is also an important issue which will be detailed later.

The question of the fishing capacity and the possibilities to develop further a national fishing fleet, either artisanal or industrial, should be addressed cautiously. There is no information on the state of the fish stock, or centralised information on the existing fishing capacities according to the various exploited fish stocks.

Market issues

Market issues deal with essentially 2 types of problems:

- Few direct exportation for valuable markets made by the Somali private sector. Somali fisheries produce around 20,000 tons of fish, among which are valuable fish such as grouper, and only 2,500 tons may be officially exported at a very low price. These valuable exports are made through piracy channels to the Emirates by Yemeni operators.
- Under valorisation of fish on the local marketing chains. The post harvesting losses are high, between 60 and 70%. Fresh fish marketing chains on local markets suffer from the lack of efficient cold chains. Stabilisation of fish by salting and drying is probably done correctly. Infestation of dried fish may be high. This is due to inappropriate conditions of landing and drying. With the return of peaceful conditions, the urban fresh fish market should benefit and local fresh fish marketing chains could become valuable

The exportation issue also addresses specific concerns:

- Direct access to the market by the Somali private sector, and knowledge of commercial intermediates and their technical requirements is currently poor.
- Lack of an administration which could warrant compliance with international sanitarian standards (in particular HACCP - Hazard Analysis Critical Control Point- plans and structural compliance with hygienic standards).
- The lack or the weakness of processing/trading plant compliant with exports norms, which also address the weakness of the investors in a context of the post war situation.
- The global weakness of the technical environment: weaknesses of the cold chains, bad sanitarian conditions and practices all along the trading chains.

Coastal Environment is under pressure

Coastal environment is under a high pressure. This is the result of the following facts:

- Human pressure is high, both for upstream and coastal activities. Deforestation, bad grazing management practices, bad shrimp farming practices, but also coastal

urbanisation, dynamite or poison fishing (suspected), uses of fishing gears, etc. do contribute to this situation.

- Environmental piracy is reported and hampers on the long term the natural potentialities of the coastal zones. This still has to be proved with precise facts, but toxic waste deposit is reported to have developed in conflict coastal areas.
- The scientific knowledge of the current situation is poor and does not enable the definition of corrective actions.
- Lack of awareness on the coastal community, in particular in the field of solid waste management amplify this situation.

Consequences

Consequences of this low valorisation are strong:

- **Competitive illegal activities hamper the development of the national industry**. As a consequence, two main items are threatened: food security and poverty alleviation.
- **There is a small contribution to the national budget**: The lack of any fisheries agreement causes a lack of regular income in foreign currency to the local economy. If taking into account neighbouring countries in the Southern Western Indian Ocean area which established a fishery Tuna agreement with the EU, the economic losses may be around 3 to 4 million euros per year directly paid to the national budget incomes. This is the level of incomes of Seychelles with a 46,000 ton per year of fishing rights given to the EU.
- This low level of economic contribution hampers the economical re-distribution to local powers, which might be more interested in conducting informal activities such as "piracy" rather than act in legitimate way. This also hampers the global perception of the interest of efficiently managing and sustaining marine resources.
- **Incomes of the private sector are decreased.**
- **Also, as a consequence of no reliable Fishery Management System, there is no sustainability in the exploitation of the Somali Fishery.**

2.2.3. Objectives

In order to solve the problems previously identified, 3 strategies of intervention can be implemented (table 3):

- Strategy 1 - Restore a framework for sustainable fisheries activities
- Strategy 2 - Prepare a comprehensive program to support the private sector
- Strategy 3 - Initiate an Integrated Coastal Zone Management Process

Table 3: Relationships between strategies and problems addressed

Problems identified	Strategy 1 - Sustainable Fisheries	Strategy 2 - Support Private sector	Strategy 3 - Start ICZM
Over-fishing	+++		+
IUU	+++		
Piracy	++		
Sovereignty	+++	++	+++
Export Capacities	++	+++	
Local market support	++	+++	
Depletion of coastal environment	++		+++
Environmental Piracy	++		+++

Strategy 1 aims at solving all problems in relation with fishing activities and Somali sovereignty in the control of the management of its marine and coastal natural resources. It also highly deals with institutional support. It will contribute to the various marketing chains by enabling a higher level of national landings. It will also contribute to environment restoration through synergies between enforcement means.

Strategy 2 aims at supporting the private sector, both on the local and export market. It will also contribute to the restoration of sovereignty by the control of sanitarian activities.

Strategy 3 aims at developing the conditions for the implementation of ICZM. It will mainly contribute in the short term to solve coastal environmental problems and piracy. It will contribute then to the restoration of sovereignty on the issue of managing the environment and its carrying capacity. Sensitisation and Environment Education can also contribute to solve bad fishing practices which lead to overfishing and destruction of habitats.

2.2.4. Intervention Strategies / Logical Framework

Strategy 1 - Restore a framework for sustainable fisheries activities

Global objective

The main objective is to create a sustainable and efficient fishery management system.

This Fishery Management System will highly contribute to the restoration of Somali Sovereignty on the exploitation of its natural marine resources, and also to a better social and economic valorisation and contribution of fishery resources to the effort of rebuilding a Somali economy. This should also enable the Somali Government to establish fair fishery agreements.

A comprehensive Fishery Management System needs to address 3 functions:

- Monitoring: provide accurate and updated information, in order to advise the political and administrative level in their management decisions.
- Control: Decide the level of exploitation for each fish stock, according to clear political goals, produce accurate administrative regulations in order to better follow and to suit political decisions.
- Surveillance: Ensure that the political decisions and administrative regulations are well implemented on the field by the private sector (which means enforcement capacities).

Expected results

In order to match the 3 objectives of a Fishery Management System, Monitoring, Control and Surveillance, the following expected results have to be achieved:

- Result 1.1 - Improved scientific capacities
- Result 1.2 - Improved Information Systems
- Result 1.3 - a functional Federal Fishery Administration
- Result 1.4 – Definition of a National and federal strategy for fishery management
- Result 1.5 - Updated legal framework
- Result 1.6 – A functional, coordinated enforcement system
- Result 1.7 - Court and legal system can sue illegal fishermen caught by enforcement system

Activities

- Group 1.1

  This group of activities aims at achieving result 1 - improved scientific capacities.

  During the 90's, a Marine and Fisheries Institute was established in Mogadishu. But after ten years, it will be quite difficult to gather all the existing Somali research capacities. Several activities have to be led to restore scientific capacities:

  - Support the establishment of scientific buildings and facilities
  - Develop international co-operation to share at sea equipment or access to Research Vessels (R/V) such as Norwegian, Fridtjof Nansen 2 and also access to historical data such as the one available within IOTC
  - Develop international scientific co-operation to train priority scientific capacities (such as data collection systems and stock assessment, or coastal environment).

  In the same way, some preliminary surveys have to be conducted to have a global and updated overview of the situation:

  - A preliminary statement of the state of the various fish stocks should be done first. The latest one was done in the mid 70's.
  - The establishment of a fishing boat registry, or at last the inventory of existing fishing capacity according to various exploited fish stocks should be also a priority survey.

- Group 1.2

  This group of activities aims at achieving result 2 – Improved Information systems.

  An integrated data system is essential to provide both the scientific community and the administration with accurate data, needed for fishery management.

  This type of information system gathers information from various other information systems, such as:

  - Direct sampling through specialised shore inquiries directed to small-scale activities
  - Collecting and archiving fisheries' industrial logbooks
  - Economics observatories
  - License registry
  - Boat registry

- Enforcement data system, Vessels monitoring system (VMS, through satellite monitoring)

In order to lead this information systems' activities, preliminary studies have to be conduct (feasibility study level), jointly with all activities directed to the restoration of scientific and administrative capacity. It will also train accurate inspection and inquiry capacity (jointly with activities dealing with enforcement - see group 6).

The information system should not be only dedicated to monitoring catches. It should also be able to provide accurate economic information to enable Somalia to negotiate fair fisheries agreements with foreign countries.

- Group 1.3

This group of activities aims at achieving result 3 - A Federal Fishery Administration is functional.

The choice of the Federal Level is done under the analysis of the existing situation and current political orientations. If the political situation changes, the type of administration will have to be adapted.

According to the various political evolutions, the activities should answer the following needs:

- Identify and define the "functions" which have to be achieved by the administration
- Define means and human resources needed
- Establish a preliminary investment and functioning budget
- Support the Somali transitional government in establishing a preliminary administrative organigramme of this future Federal Fishery Administration.
- Monitor and evaluate the efficiency of this Federal Fishery Administration after a certain delay, in order to adapt it to the political and technical situation.

- Group 1.4

This group of activities aims at achieving result 4 – Defining a National and federal strategy for the fishery management.

Fishery Management can only be done when the political level has decided a goal of management. Several goals could be chosen:

- Maximum Biological Productivity
- Contribution to the economy by maximum sustainable employment (which generally leads to a situation of slight over fishing)
- Contribution to the economy by the maximum economic profitability of the stock
- Contribution to the economy by foreign currency earnings,
- Etc.

These goals are not always concordant and could be in opposition, according to the various biological situations, existing private sector, technical choices of exploitation, etc. The situation here is also more difficult because of the Federal organisation: various governments may have different goals for the same shared stock. It is very important to have a concordant fishery management goal for the same fish stock.

The activities led in this group will have to address the following needs:

- Train and inform at the political level on the various possible goals, their synergies and their potential oppositions, their benefits and their risks

- Animate a political debate, both at regional and national / federal levels in order to define a comprehensive Fishery Management Policy, decided by Somali People.

- Group 1.5

  This group of activities aims at achieving result 5 – Updating the legal Framework.

  The political strategy and the administration organisation need to be stated within a fishery law and its implementation decrees. FAO did support national administration and political power since the end of the 90's until now to adapt their regulation system to the new code of conduct for a responsible fishery.

  The same type of activities should be conducted (support to the administration in defining an updated legal framework for fisheries).

  One important point is such activities should bear in mind the consequences of preliminary activities (see group 1 to 4).

  Another point is that such activities should comply with international legislation dealing with fishery exploitation (United Nations Convention on the Law of the Sea - UNCLOS), to make it efficient against international IUU.

- Group 1.6

  This group of activities aims at achieving result 6 – a functional coordinated enforcement system.

  Enforcement is fundamental, especially as regards the current situation of IUU activities in Somali EEZ. This enforcement will also enable solving the situation of piracy activities.

  The situation of the at sea means available for the enforcement system is not known by the expert team.

  If the relevant information is not available, a preliminary feasibility study should be conducted in order to establish the inventory of existing capacities and their suitability and their "availability" to conduct enforcement operations.

  The "availability" of at sea means should take into account the question of federalism and regional issues. The opportunity to develop a "coast guard" like corp should be assessed, in connection with both fishery administration and Navy. This question is quite sensitive as dealing with security matters, and should be addressed from the beginning jointly with Army agreement (Navy, Air Force and Onshore forces).

  Another feasibility study should sketch the global enforcement system, including procedures and inter-relations between the regional means and administration, and also should state on the opportunity of involving various actors or create a fishery surveillance corps by itself.

  The implementation of the recommendations of these various studies will probably lead to a full project specialised in strengthening enforcement capacities within the scope of MCS.

  An important point to be considered is that MCS does not only deal with enforcement activities, but is integrated in a full and comprehensive approach of the Fishery Management. The project should be fully integrated in the Future Federal and regional Administration.

  A clear enforcement system and a licensing authority, including Vessel Monitoring System, will contribute to enable the establishment of valuable regular fishery agreements.

- Group 1.7
  This group of activities aims at achieving result 7 -Court and legal system can sue illegal fishermen for fishing infractions.

  The legal system and the court must be efficient in prosecuting illegal fishermen, otherwise the whole system is not efficient. This supposes a clear and efficient legal framework, but also a court able to pursue and get the fine paid.

  This should be a major condition for the attribution of any support for strengthening an MCS system. Training of lawyers must also be a priority.

Hypothesis & Assumptions
Some actions could be interlinked with regional projects dealing with trans-boundary management, such as SWIOFP, or through a stronger involvement within the SWIOFC (which is already engaged). Co-operation with official authorities from Yemen or Kenya is actually the best way to fight against IUU operated through their harbours. And this supposes the settlement of a regular and official Fishery Management System and authority.

Priorities
The main priorities would be to engage the prefeasibility and feasibility surveys already identified.

As IUU is considered a major issue, it could encourage stakeholders to engage in the creation of a real Fishery Management System.

Strategy 2 - Prepare a comprehensive program to support private sector

Global objective
The main objective is to strengthen the Somali private sector.

This strategy should mainly support the issue of marketing, both at a local and export level.

The various supports to fishermen would be targeted as training and sustainable living means, rather than support the creation of fishing capacity. This last point should be addressed after a clear global overview of the situation of local fisheries and needs of restoration.

Expected results
- Result 2.1: Know-how in post-harvesting good practices is improved in small-scale fishing communities
- Result 2.2: An official administration is functional to accredit Private sector exportations
- Result 2.3: Direct support to private sector is available to match international standards for exportation
- Result 2.4: Direct links between Somali traders and customers/wholesalers within targeted countries are established.
- Result 2.5: The global technical environment is suitable for efficient trading chains within the country and at the exporting points.

Activities

- Group 2.1
  This group of activities aims at achieving result 2.1 - Know-How in post harvesting good practices is improved in small - scale fishing communities.

Post-harvesting issues should be better known before making a plan of action: who are the main actors, taking into account the gender issues in identifying who is involved in marketing chains. This requires implementing market chain surveys on the local market, especially with socio-economic components.

According to the information available to the expert team, the assumption is made that the problems of post-harvesting losses involves both an issue of pest infestation due to low levels of hygiene in handling and processing the raw materials and an issue of processing technology.

- Group 2.2

  This group of activities aims at achieving result 2.2 - An official administration is functional to accredit private sector exportation.

  In order to insure that fisheries products match the standard requirements of exports, and in particular EU and US norms, the existence of a specialised national administration is compulsory.

  Three types of actions should be implemented:

  Building capacities within the field of veterinary sciences dedicated to these questions

  Setting up an accredited laboratory known as a reference laboratory.

  Enhancing the Legal Framework regarding this issue.

  These actions should be conducted with respect to the political organisation and various Federal/ Regional mandates.

- Group 2.3

  This group of activities aims at achieving result 2.3 - Direct support to private sector is available to help match the international requirements.

  Private investors may not be fully aware of the technical requirements to enable them to export to valuable markets. These norms are complex and require various levels of know-how:

  - in the structural situation of the processing plant or trading chains (structural conformity to hygienic standards)
  - in the day-to-day practices of manpower
  - in the existing internal procedures

  The following type of activities should be implemented:

  - Investments in ad-hoc processing/trading facilities. The investment capacity of the industrial private sector involved in the fishery business is not clear for the expert team according to available information. If a real problem of investment capacity is noticed, some investment loans should be implemented, designed in such a way to secure their sustainable reimbursements (which warranties?)
  - Training of manpower
  - Design of HACCP (Hazard Analysis Critical Control Point) plans, with the support of qualified experts. The opportunity for Somalia to join the current EU project "All ACPs" (Africa, Caribbean, and Pacific) should be evaluated. This project aims to provide assistance to ACPs countries in matching the standards for EU exportation.

- Group 2.4

  This group of activities aims at achieving result 2.4: Links are established between Somali traders and final wholesalers who belong to valuable markets.

The aim is to capture added value which is currently collected by Yemeni or other nationalities' fish collectors, who buy the raw Somali fish at a low price and trade it on valuable markets.

The assumption made is that current Somali producers or investors are isolated from their potential commercial outlets. If this situation is confirmed, the following activities could be implemented.

- Support to the various Somali businessmen dedicated to the trade, the processing and the exportation of fishery products in organising in the Chamber of Commerce (as it was previously done)
- Support the implementation of trade surveys (expected markets, expected prices, technical requirements, customer expectation, conditions of selling fish, i.e. Fresh, Frozen, whole, fillet, etc.). See existing fish market databases such as INFOSAMAK from INFOFISH- FAO. (see http://www.infosamak.org/english/) for which Somalia is a member country.
- If necessary, realize feasibility studies to implement warranting funds to protect payments and to emancipate them from their previous relationships with Yemeni Intermediates.
- Organise joint business prospects in the potential commercial outlet countries such as UAE (United Arab Emirates), Djibouti, Arab Gulf countries, European Union (See participation to international Fishtrade Fair), prepare specialised trade documentation as a catalogue of Somali fishes, Directory of Somali Traders or Processors.

- Group 2.5

  This group of activities aims at achieving result 2.5 - Global technical environment is suitable for efficient trading chains within the country and at the exporting points.

  As mentioned before, benefiting from an accurate technical environment will benefit both for local and export markets. This technical environment may be enhanced by the implementation of the following actions:

  - Restoration of cold chains : Cold storage, and the use of ice in the trading chains (available through the implementation of ice plants) will benefit any Fresh fish marketing chains, either for new urban valuable fresh fish consumption or for the supply of high quality raw material for conditioning and export.
  - Building trading facilities : Suitable outdoor market places will structure trading chains on the local market adequately, to future quality requirements of Somali urban consumers
  - Build/restore landing sites or processing facilities (collective dryers, etc.) : a clean landing site is required to prevent pest infestation and to match hygienic export standards. Sanitarian EU inspections do not only take care of what happens within processing or conditioning private plants. It is the whole chain which is inspected, from the boat and inboard ice to the export point (e.g. airport cold storage).
  - Socio-economic surveys and training dedicated to fishfolk organisations (fishermen, women, fishmongers, etc.) for the day- to-day management of the collective facilities, and especially all facilities located in fishing harbour and landing points. This is an important issue which has to be addressed, if the aim is to insure sustainability of these facilities, through a profitable and efficient management.

Hypothesis & priorities

The knowledge of the marketing chains by the expert is quite poor due to the lack of updated information. This strategy is given as an indication of possible intervention.

The carrying out of a wide identification survey must urgently be conducted.

Strategy 3 - Initiate an Integrated Coastal Zone Management Process

Global objective

The main overall objective is to initiate actions which will contribute to a better environmental management of the coastal zone.

The current political situation or even mid term situation is not suitable to develop a full ICZM (Integrated Coastal Zone Management) process.

The goal is to prepare the conditions to start later on a comprehensive ICZM Strategy, through the collection of accurate knowledge and preparation of the actors to start this process.

Nevertheless some urgent actions against environmental piracy should also be initiated. They refer both to Environmental and Sovereignty Goals.

Expected results

- Result 3.1: The knowledge of current threats against the coastal environment is enhanced
- Result 3.2: The Sensitive ecosystems such as mangrove, shore line and reef ecosystems are recognized as a patrimony of interest for the future.
- Result 3.3: Legal framework takes into account Coastal Environment concerns.
- Result 3.4: Environmental coastal piracy is stopped
- Result 3.5: Environmental education is developed
- Result 3.6: The opportunity to develop a fair tourism industry dedicated to coastal and marine areas is assessed

Activities

- Group 3.1

  This group of activities aims at achieving result 3.1 - The knowledge of current threats against the coastal environment is enhanced.

  The global overview of the situation of the various threats all along the Somali Coast was not available to the expert team.

  The processing of a preliminary study is of great importance to precisely identify priority areas and actions. The UNDP and UNEP already recommended in June 2006 to urgently conduct a field mission to confirm the rumours of environmental piracy. Precise state of activities in mangroves and confirmation/infirmation of dynamite fishing on coral reefs areas should be also conducted.

  A classification of sensitive areas under stress should be conducted in order to give a clear decision-making support and to define an urgent plan of action against the worst threats, and especially long term impact and biodiversity/habitat threats.

- Group 3.2

  This group of activities aims at achieving result 3.2: The sensitive ecosystems such as mangrove, shore line and reef ecosystem are recognised as a patrimony of interest for the future.

  This recognition should be gained through the conduction of scientific activities on these sensitive areas which should point out the relationships between protection of these sensitive ecosystems and other productive activities, e.g. nursery areas for fish stocks, area of endemic species as regards biodiversity concerns. Relationships between upstream and downstream activities should be also identified.

  The output of such surveys should also clearly help the decision makers in establishing Allowable levels of exploitation within these areas, by taking into account the notion of the carrying capacity.

  An economical assessment should also be conducted, and eventual zonage according to ecosystem concerns should be identified.

  Potential Marine Protected Areas (MPA) should be identified in order to supply decision makers and local communities with accurate information. Community based management should be implemented at last for the establishment of these potential activities. Socio-economics and gender issue data should be prepared in this prospect.

- Group 3.3

  This group of activities aims at achieving result 3.3 - Legal Framework takes into account Coastal Environment Concerns

  According to the results of the group of action 3.1 and 3.2, the regional and federal Legal Framework should be updated in order to legitimize actions and enforce against environmental bad practices and piracy.

  Institutional responsibilities should be clearly identified in order to avoid conflicting institutional mandates between Ministries or Agencies.

- Group 3.4

  This group of activities aims at achieving result 3.4 - Environmental coastal piracy is stopped.

  In relation with the group of activities 3.3, enforcement means should be implemented and responsibilities identified to insure an efficient prevention of environmental coastal piracy.

  The involvement of local powers should be gained aiming to a better efficiency of the enforcement.

  At sea means should also be coordinated with those involved in Coast Guards, Army and Fishery police. Recent event in Ivory Coast (Piracy toxic deposit in wetland areas) shows the importance given by the civil society to such concerns.

- Group 3.5

  This group of activities aims at achieving result 3.5 - Environmental Education is developed in Coastal areas.

  In order to fight efficiently against bad environmental practices, a long term involvement is needed.

  Environmental education is one of the means to be implemented, through the classical education system, but also through sensitisation of local powers and coastal communities.

In order to gain efficiency, the administration could resort to local NGOs to help them in designing and implementing this sensitisation.

- Group 3.6
  This group of activities aims at achieving result 3.6. The opportunity to develop a fair Tourism industry dedicated to coastal and marine areas is assessed.

  Tourism is an important source of foreign currency. It could also provide employment locally and support other actions. Successful MPAs always combined tourism as alternative to the previous economics activities which impacted too much the coastal environment.

  A group of surveys should be conducted in order to identify potential areas of Fair Tourism interest, especially in connection with MPAs. Connection with local communities should be pointed out. Legal aspects should also be taken into account.

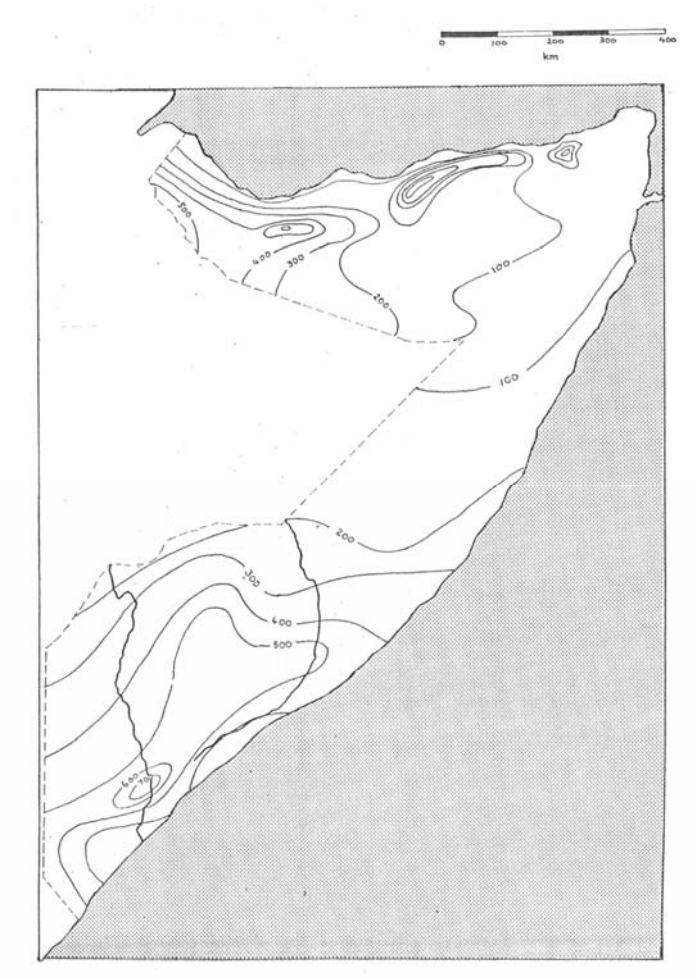
2.3. Agro-pastoralism and forestry

2.3.1. Sector review

Physical conditions of Somalia

Somalia covers an area of 637 539 km² between latitudes 12°N and 1°35'S and longitude 41°E and 51°W. Most of the country consists of plains, with a high mountain escarpment in the North, facing the coast (the Goolis Mountains). The highest peak in this range reaches 2,400 m. Only two permanent rivers, the Jubba and the Shabelle, water this dry land. Both originate in the Ethiopian highlands, but only the Jubba flows into the Indian Ocean, the Shabelle loosing itself in a swampy terrain. The climate is hot with a low rainfall (see Map3), exceeding 500 mm only in the most favorable region (the South). Annual average rainfall throughout most of the country is between 200-300 mm. The mean annual temperature varies according to the location between 25°C and 28°C. In the North, 45°C can be recorded during the hot summer days, while the temperature can drop to just above 0°C in the mountain range during the winter. Different general maps (topography, temperature, rainfall, soils) are available in Bowen (1990).

Map 3: Somali rainfall isohyets (Leslie, 1989)



Vegetation of Somalia

In such an arid country, for the most part, the vegetation is xerophytic in character. Common genera such as *Euphorbia*, *Commiphora*, and *Acacia* all show classic adaptation to growth in a dry environment. The natural vegetation of Somalia has come under only limited investigation by plant taxonomists and ecologists. Studies on the main vegetation formations are needed to assist the development of the country's resources and a significant proportion of the species have still to be elucidated (Bowen, 1990).

Table 4: Vegetation types of Somalia, by area, from White (1983) reported by Bowen (1990)

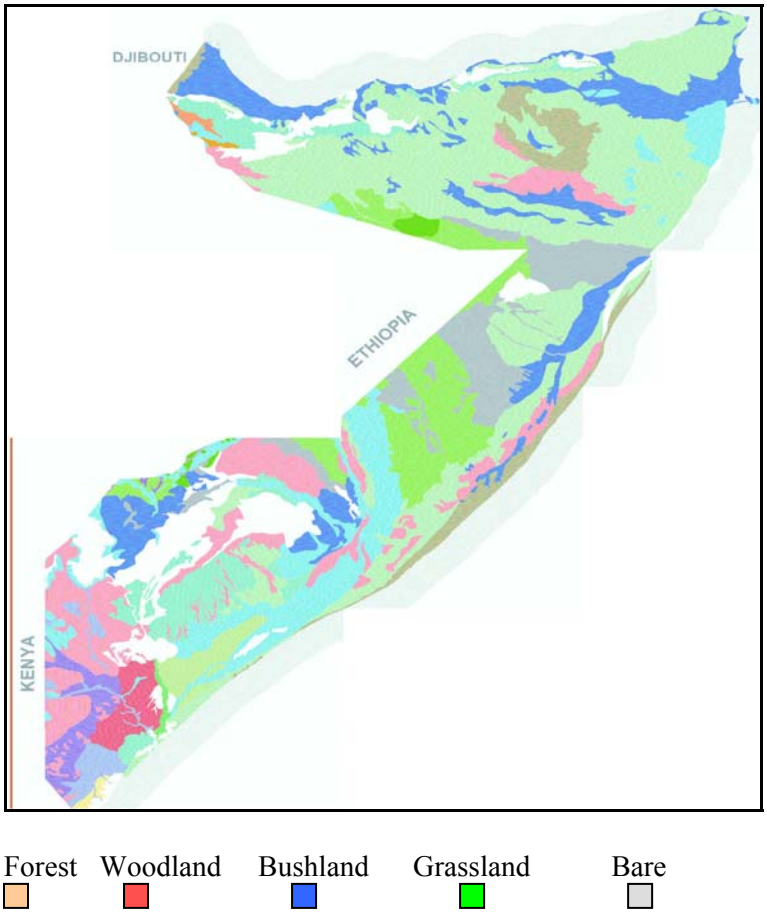
Vegetation type	Area ('000 ha)
Acacia Commiphora deciduous busland and thicket	42,400
Semi-desert grassland and shrubland	17,600
East African coastal mosaic	2,400
Evergreen / semi-evergreen bushland and thicket	900
Absolute desert	200
Undifferentiated mountain vegetation	100
Coastal desert	100
Total	**63,700**

The *Acacia Commiphora* formation is a dense bushland (3-5 m tall with scattered emergent trees up to a height of 9 m). It is at its most well developed in the relatively high rainfall areas of the Bay region where *Acacia bussei* is predominant.

The second most widespread vegetation type is a semi-desert grassland and shrubland which is true rangeland. Occurring in areas with an annual rainfall of less than 200 mm, the vegetation is low-lying with species of *Aloe* and *Euphorbia.*

The East African coastal mosaic refers to a small area of open woodland centered on the Holowajir depression in the far south of the country. This vegetation type appears to have come under no recent botanical investigation, perhaps as a result of difficult access into the area. Two remaining vegetation types are true high forests which occupy less than 2% of the country area. The first of these forest types is the riverine forest on the Jubba and Shabelle rivers. Confined to the rivers' edges, these forests are subjected to periodic flooding. A large part of these gallery forests has been eliminated. The other example of high forest occurring in Somalia is the juniper forest found in a few localities within the Goolis Mountains in the northern hills. But this forest has also been largely destroyed by over-cutting and over-grazing.

Map 4: Vegetation Map (UNESCO *et al*., 2004)



Land use systems of Somalia

According to UNDP's Annual Development Report for 1987 (United Nations Development Programme), only 13% of Somalia is considered suitable for permanent cultivation. Pastoralism is judged possible on a further 55% of the land area, whilst the remaining 32% is classified as non-agricultural.

Somalia can be divided into three land use zones:

(1) The North, where pastoralism with camels, goats and sheep is the predominant form of land use. Only small areas can be cultivated.

(2) The central rangelands, where pastoralism is also the dominant land use but with a higher proportion of cattle in herds.

(3) The South, where there are the Jubba and Shaeelle rivers, a generally higher rainfall and more fertile soils allow large scale settled agriculture. Livestock husbandry and particularly cattle remains an important activity.

The important soils for settled agriculture are generally those having higher clay content. These include vertisols, fluvisols, cambisols, luvisols and the nitisols, and account for 20% of the total land area mostly in the interiverine areas. Elsewhere, nutrient deficient soils and saline soils predominate.

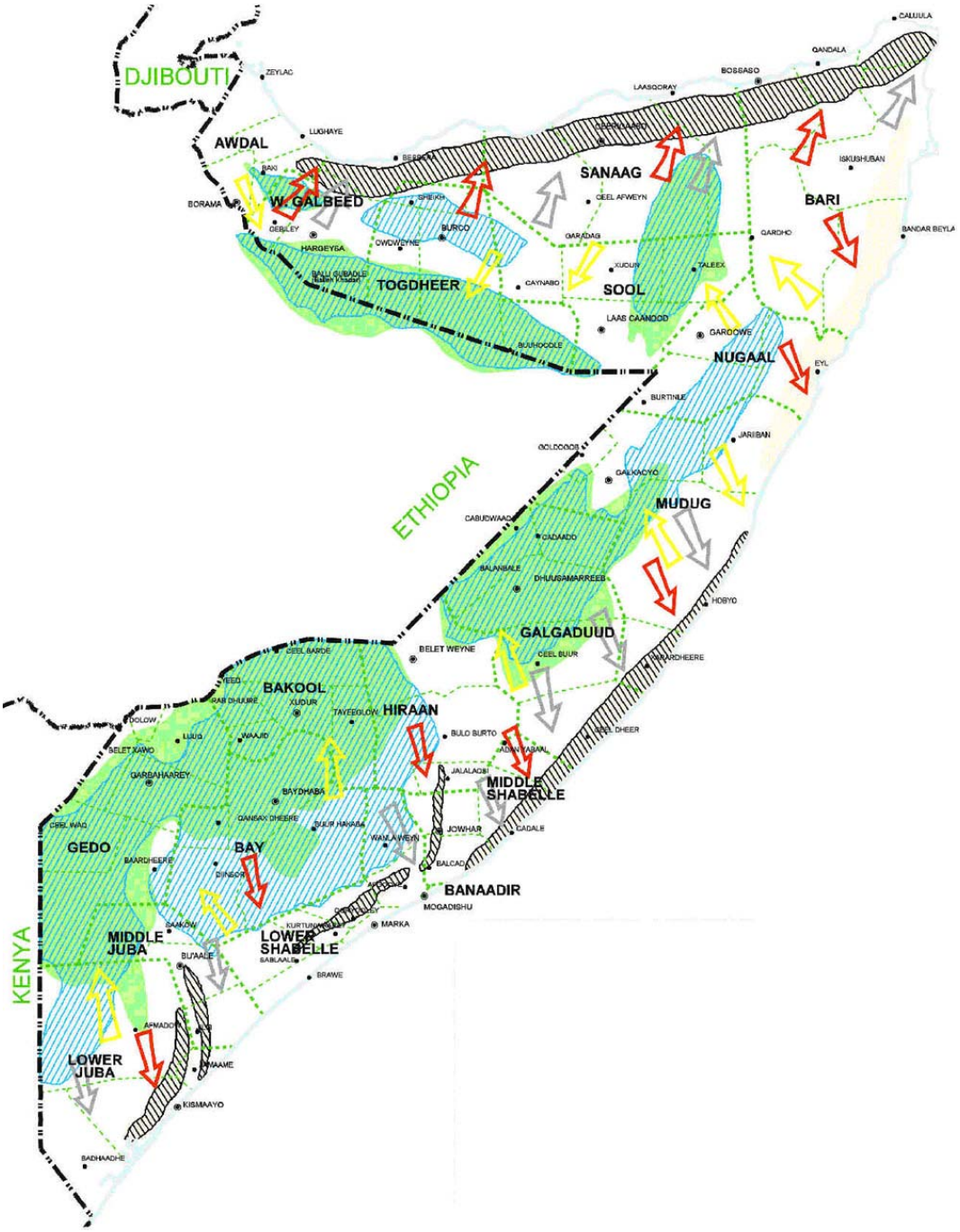
Livestock husbandry is the main export activity. Bananas are cultivated on prime irrigated land. It was the 2nd export product before the civil war. Presently, banana production is very low. Mangoes were also exported. Four main crops are grown (maize, sorghum, sesame and cowpeas). Sesame is an important cash crop. On irrigated land, vegetables and fruits are grown throughout the year. There is no great land scarcity but crop production is limited by water supply. Due to the bimodal rainfall and the different timing in seasons across the country, the crop calendar is variable and complex. During the 15 year civil war, the agricultural sector in the South was greatly damaged and the productive infrastructure destroyed.

Pastoralism

The majority of people in all Somali areas mainly depend upon livestock for their livelihood (milk from camels and cattle, meat from cattle, sheep and goats). Traditionally, the pastoralist system provided the population with mechanisms for coping with changes in the natural environment. Pastoralism was therefore characterized by a high mobility of herds looking for drought reserves during the dry season - as long as pastures supplied sufficient fodder for the animals. However some drastic changes have occurred. Grazing areas demarcated for rotation purposes were abandoned after the collapse of the Siad Barre regime. These reserves were turned into private pasture land by individual clans resulting in the decline of the communal areas available for grazing. Parallel to this development, an increasing semi-sedentarisation of the pastoralists has been observed following the construction of a large number of wells and boreholes. Both factors resulted in a severe degradation of pastures. In the North and North-East, the semi-nomadic population often has a farm where some cows and milk-lambs are kept – while the herds are moving during the dry season.

Map 5: Grazing Areas (UNESCO *et al*., 2004)

Legend	
Grazing in dry season	Grazing in rainy season
Migration in dry season	Migration in rainy season
Normal migration in DS	Normal migration in RS
Abnormal migration in severely dry season	



Forestry sector

Trees and shrubs play an important role in Somalia's economy. The natural bushland provides fodder, fuelwood, charcoal, construction materials and other necessary products for humans. Forests and Savannah woodlands contribute to protecting the very fragile Somali ecological conditions that are inherent. Wildlife is being nurtured in a forest and woodland environment. As a result, Somali fauna is unique in a spatially and ecological point of view. Forest resources are strongly being depleted. Huge areas, previously covered by trees, have been deforested. This has led to wildlife extinction and soil erosion.

Charcoal is still exported despite the existence for many years of an export ban. Today charcoal is the second largest foreign currency export earner after livestock. The preferred species for charcoal production are *Acacia bussei* and *Acacia nilotica,* although a lot of other species are also used such as *Acacia tortilis, Acacia melifera, Terminalia polycarpa*, etc. The "*earthen -clamp*" method used around Mogadishu and in the Bay region, was highly efficient and has approached the theoretical maximum of 40 percent of charcoal production. In the far North and in the South, a "light and quench" method has only 10-15 percent of efficiency (Bowen, 1989).

About 85% to 95% of the domestic energy requirements in Somalia are dependant upon wood and charcoal fuel sources. Demand was reported at approximately 4 Mm^3 of wood annually (Warsane & Hassan, 1987).

In addition to the demand for fuelwood, there is also a growing demand for construction poles. This market was estimated at 144,000 m^3 in 1980 (Bowen, 1990).

Frankincense obtained from tapping *Boswellia* species growing in the North-East, myrrh from *Commiphora*, in the South and the North-East, Arabic gum from *Acacia* spp., and yicib nuts from *Cordeauxia edulis* (thought to be endangered) in central regions, are also important wood products.

Frankincense used to be Somalia's fourth largest foreign currency export earner with an annual production of 12,000 tons. *Boswellia* are highly prized trees with tree tenure systems. Although they are not cut for charcoal or other uses, their natural regeneration is threatened by over-grazing (EC/IUCN, 1997). Today, this sector is in a state of neglect. Now, since production and export is no longer regulated, there are concerns about the scale at which trees are being "tapped". Somali trade in myrrh is small compared to the frankincense market. *Acacia senegal* is common in Somalia although no organized industry exists. Gum-arabic from this species is collected in the South and exported to Kenya.

Timber production is of little importance in Somalia. Before the civil war only one sawmill existed in the North-West, which used to process wood from natural *Juniperus excelsa* forests. Almost all timber for construction, joinery and carpentry industries is imported. Imports' figures were reported to around 16,000 m^3 of sawn timber and 7,000 tons of paper per year by Bowen (1990).

In conclusion, the forestry sector has contributed a lot to the national economy although it has been strongly neglected. Current overexploitation of the vegetation will plainly result in disaster for Somalia.

Traditional agroforestry practices

Live fencing is extensively used in Somalia, mainly to restrict livestock movement. It occurs around the huts and lining tracks through agricultural land. On rain-fed agricultural land, scattered trees are retained. These provide limited dry season browse, fruits, nuts and poles and are mainly used as shade for farmers and livestock. Natural bush fallow is often used to restore soil fertility. Tree planting is mostly for protection of agricultural land, stabilization of sand dunes, fruit production and amenity. Wind breaks have been established for the purpose of increasing agricultural production near the two main rivers. On irrigated land, agricultural crops are commonly grown alongside young fruit trees until shade becomes too great (Leslie, 1989).

2.3.2. Identification of problems

Pastoralism at the crossroad

Pastoralism has a large impact on the environment and, hence, it needs to be considered in conjunction with natural resource management. Vice versa, the use and improvement of natural resources have large implications for pastoralism and concomitant livestock production.

Environmental degradation

In 1989, there was already a widespread belief that woodland over large areas of the country was declining both in terms of area and species richness. The more pressing causes were over-cutting and overgrazing. During the last 15-years of civil war, the agricultural productive sector was greatly damaged and natural resources were put under more pressure. Bushland was cleared for charcoal production and fence enclosures. Tree destruction has increased wind and water erosion, and has eliminated valuable dry season fodder for livestock, and has naturally led to conflicts. Furthermore, in arid zones, trees generally provide favorable microclimatic and soil conditions for the growth of the herbaceous stratum. On the treeless and windswept rangelands, the herbaceous fodder production is now more susceptible to the effects of drought. The recent 4-year drought (which ended in 2004) resulted also in overgrazing and destruction of trees. Massive degradation of natural resources resulted in a serious threat to livelihoods and future development.

Pastoralism problem

Both factors – enclosures and "semi-sedentarisation" due to water points' creation – have contributed to deterioration of the areas and lowering of the range's quality, which apparently exceed their carrying capacity. The disappearance of traditional adaptive management strategies has increased production risks for herds' owners. Land enclosure has also created conflicts amongst communities. Reduced livestock mobility leads to a less effective livestock production and contributes to a destruction of the natural resources.

Institutional aspects

Legal and institutional responsibilities are unclear. Institutional capacity for addressing environmental problems and enforcing regulation at federal, regional and local levels is weak to non-existent. Both problems call for immediate clarification of legal responsibilities. The key issue of charcoal production and export must be addressed as soon as possible. Export is no longer regulated for most tree products traditionally exported as well as for livestock.

2.3.3. Objectives

General topics

Sustainable management of natural resources will drive Somalia's productive capacity. So the public sector will need to address specific environmental issues such as fuel-wood conservation and land-use planning in the context of extensive natural resource use by the private sector.

In order to stop degradation of rangelands, the current trend of tree over-cutting needs to be reversed. The charcoal export ban must be enforced and the development of alternative energies (gas, kerosene, fuel) in towns should be supported.

Livestock production and management strategies will also need to be aligned with seasonal fodder availability. Changes in flock management, production and marketing strategies by selling animals at younger ages should increase the rentability of livestock husbandry. A trend towards lowering stocking rates during the drier part of the year will also contribute to the long term rehabilitation of rangelands. On the other hand, livestock nutrition needs to be improved in order to increase milk and meat production for local consumption and export. For that purpose, strategies for increasing fodder production and quality during dry season on rangeland as well as on irrigated land will be identified.

Strategies for wide use of multipurpose trees will be identified to increase production of wood, fodder, food, gum and resins. Crop and pasture protection and soil fertility conservation and amelioration are important services that trees can provide while diversifying production and generating income revenues.

Harvesting, processing and marketing of forest products

Harvesting, processing and marketing of forest products should ideally conform to a forest strategy and be in accordance with forest management plans. These plans should accommodate the realities of the needs of the users or industry without violating the principles of good forest management practices. For any tree product, employed marketing systems should provide fair return to the grower thereby encouraging production and subsequent renewal of the resource base. For tree exports such as Frankincense and Gum Arabic, sustainable improvement of supply chain networks is a prerequisite to guarantee the stability of economic returns to producers and collectors. Higher prices for these products would give incentive to the collectors and could be achieved through better contractual arrangements between chain partners (producers/collectors, traders, processors and exporters) and through better access to existing foreign markets.

Potential of increased rangeland resources

While "semi-sedentarisation" and range enclosure can have various negative environmental impacts, they may also offer opportunities for improved land management, permanent investments in land productivity and the application of innovative technologies. Small favored areas in the range -such as drainage areas- may be used for pasture (fodder trees, grass) and food crop production (vegetables). These spontaneous closures may be exploitable to develop some conventional "ranching" concepts. Temporary protection against livestock will lead to natural regeneration of tree and grass species and increase the rangeland's biomass production. In these reserves, pasture can also be improved by sowing local grass (*Cenchrus ciliaris*). Production and protection of fences could supply fodder during dry seasons.

Livestock management and nutrition

The key issue of rangeland stocking levels must be addressed as soon as possible as it seems to negate development efforts. Management of the different categories of herds (camels, sheep, goats and cattle) would be improved by selling old and less productive animals and shortening the development cycle of the animals. Lowering the age of the first dropping, shortening the interval between droppings and improving the nutrition of the animals would result in selling animals at a younger age with a higher price. Supplementing the feeding ration with agricultural and/or industrial by-products or tree forage, would increase the overall protein, vitamin and mineral content and thereby increase meat and milk production.

The potential for Agroforestry in Somalia

Incorporation of multipurpose trees and agroforestry techniques into farming systems will diversify agriculture, enhance income generation and contribute to land improvement and biodiversity preservation. It is in the higher rainfall areas and irrigated ones that there is a potential for agroforestry based on widespread tree planting.

Agroforestry can benefit small and large farmers. Small farmers require a large number of products from their land (food, fodder, fuel-wood, and lumber). They are also likely to adopt a diverse farming system to minimize risks. Large farmers have capital to invest in expensive systems such as shelterbelts.

Extension efforts

Traditional nomads are not planting grass and trees because it is not in their interest to do so. The concept of extension may be difficult to apply except in a context of sedentarisation with closures establishment. Educating communities on the advantages of range closure and land management is something of paramount importance. As forestry activities are attractive in rural development, they need to be included in a global extension program to avoid conflicting advice from diverse disciplines concerning use of limited resources. Farmers can be encouraged to adopt agropastoralism and agroforestry practices through demonstrations and possibly free seedlings eventually.

Alternative activities to pastoralism

Literature currently reports that the human support capacity of Eastern Africa and particularly Somalia has been exceeded. *Since neither primary productivity (pasture) nor secondary productivity (livestock) can be easily improved, it should be of the highest importance to*

develop alternative means of livelihood in the non-pastoralist sector of the economy: agriculture or others (GFA Terra System, 2005).

2.3.4. Intervention Strategies / Logical Framework

Lessons from the past and use of traditional knowledge

Generally, the literature outlines a lack of documents about past activities of research and development projects in forestry and pastoralism. To avoid duplication of past mistakes by new incoming projects, it is necessary to have access to these documents. In order to minimize the necessity for behavioral changes in the target population, it is recommended to use indigenous knowledge as well as to use and support traditional coping mechanisms. Moreover, existing organizations that prove themselves adequate should be used in order to avoid too many innovations that might not be fully accepted by the beneficiaries. Experiences and support from neighbor countries would be beneficial.

Institutional aspects and organization management

It is of a high importance to facilitate establishment and strengthening of agropastoralist and pastoralist organizations and associations at local district, regional and national levels that can manage land resources in a sustainable manner, and that can defend their interests. Development agents would be trained in order to be capable to work with these organizations and associations.

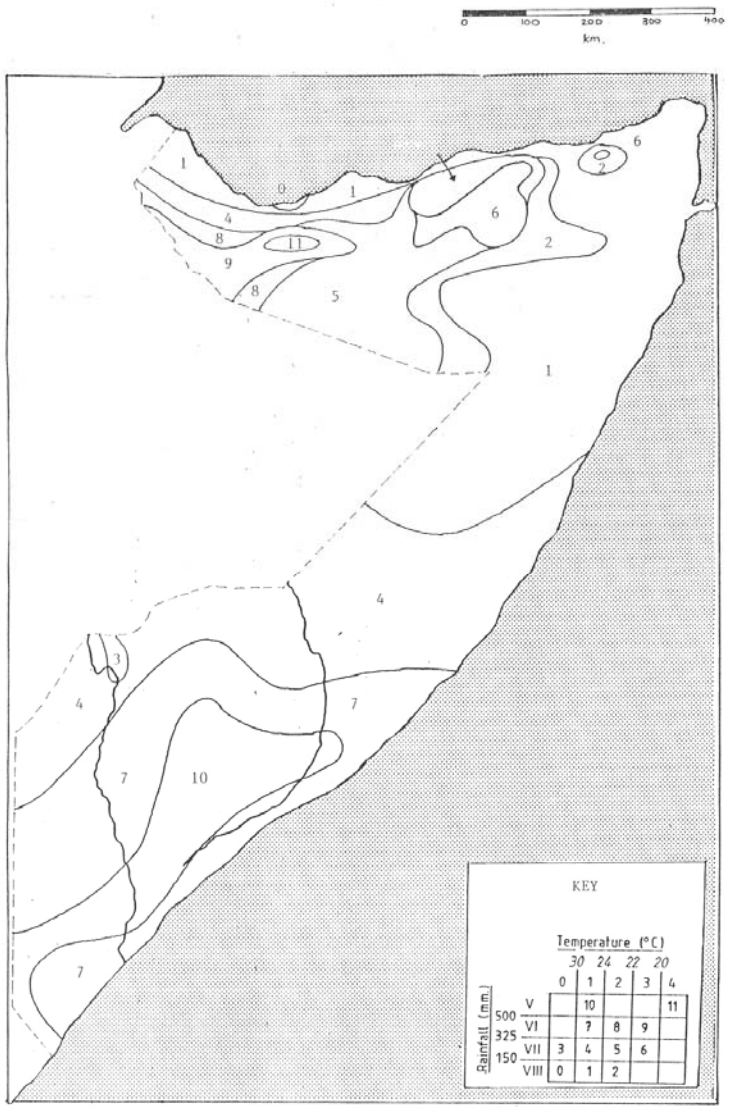
Limitations for agroforestry and tree plantations in Somalia

- **Physical limitations for tree plantations**

  Most of Somalia is characterized by an arid or semi-arid climate with a bimodal yearly rainfall pattern. Hutchinson (1989) has classified Somalia into "agroforestry zones" based on a simplified version of Teel's agro-climatic classification. This gives a good general view where certain crops and trees will grow successfully. It is based on rainfall and temperature data only and ignores the importance of irrigation (see Map 6). There are 12 zones ranging from 0 (the hottest and driest) to 11 (the wettest and coolest). Growth rates in arid areas are so low that there is little incentive for wide-scale tree planting. In these areas, which cover much of Somalia, trees could be best established by promoting natural regeneration. Techniques include reducing browsing, scarification, and using a mulch of dead branches.

  In the Southern regions and Northern mountain areas, higher rainfall allows growth rates that make tree planting worthwhile. This corresponds to zones 7 through 11 with rainfall generally higher than 300 mm a year. Also, irrigated areas outside these zones or with a high water table may be suitable. Rainfall in most of the country averages less than 450 mm a year. Any tree planting can therefore only take place at the very start of the main rainy season (late April – early May).

Map 6: Agroforestry zones of Somalia (Hutchinson, 1987)



- **Land tenure and tree ownership**

  In Somalia, a complex system of clan/feudal ownership exists for land, trees and use rights. Clan members have the right to the land as long as it is cultivated. Land can be handed down from one generation to another. When the land is no longer cultivated, it falls under the control of the clan. Excess land is either rented for cash or for part of the crop. Rental is usually for a year only which gives little incentive for a tenant farmer to plant trees; so tree plantation must be at the initiative of the owner. Long living trees (coconut, mango) are often handed down from generation to generation.

- **Education**

  Manuals, films and posters have been published on tree planting and on benefits from trees and in order to discourage activities leading to land degradation. But these activities were most prominent in towns and not in rural areas. There is a little tradition of tree planting, although the Government has encouraged it in the past through providing free seedlings.

Enrichment of existing agroforestry parklands through natural regeneration

An evaluation with farmers is needed to find the best strategies to improve existing parklands. Given the high cost of projects, focusing on tree planting, protection and stimulation of natural tree regeneration should be encouraged. In most areas of Somalia, naturally regenerating trees are retained in agricultural land. These provide shade, fodder (evergreen species), fruit and building materials. Farmers tend young seedlings of useful tree species. Often a shelter of dead thorny branches is built around the seedlings to protect them from browsing. The most common species retained on cultivated land in Southern Somalia are *Dobera glabra, Balanites aegyptiaca and Salvadora persica* and *Ziziphus spinachristii*. On the lower Jubba, some species (*Hyphaene thebaica. Adansonia digitata. Ficus spp., Garcinia livingstonei, Tamarindus indica*) are often left in farmers' fields and they provide edible fruits.

Example of tree parkland potentially useful for Somalia and to be developed in the long term: The *Faidherbia albida* parkland

Farmers actively regenerate tree species when the benefit of their investment is guaranteed. *Faidherbia albida* is a multipurpose tree, widely distributed in agroforestry parklands in semi-arid Africa and is considered as an excellent agroforestry species. It develops complementary and facilitation relationships with associated annual crops for resource use. This N_2 fixing tree has a reverse phenology. As a phreatophite species, the tree is in leaf, growing and fruiting during the dry season. It shades its leaves during the rainy season, limiting the competition for light with the crops. Its pods and leaves provide valuable dry season fodder and the soil under the tree is enriched by the decomposition of tree litter and by the dung of animals browsing in the field. That results in an increase in crop yield in the vicinity of the trees especially in nutrient depleted soils. In the semi-arid zone, 30 to 40 mature trees per ha are recommended to give high cereal yields. *Faidherbia albida* parklands are generally associated with continuous cropping systems and cattle breeding (Les parcs à *Faidherbia albida*, Cirad, 1996).

Although *Faidherbia albida* occurs naturally in the North-West of Somalia, it is only in the last 20 years, with the encouragement of aid organizations, that intercropping with this tree has been attempted in the South. As initial growth of planted trees is rather low (less than 80 cm in the first year), it may be difficult to persuade farmers, to adopt such a practice. *Faidherbia albida* usually shows high potential of growth and natural regeneration on sites with high water table and these sites must be chosen in priority. If a tree resource occurs in some spots after the action of previous projects, conservation of naturally regenerated *Faidherbia* can easily be encouraged through incentives.

Establishment of block plantations

In order to renew the resource base, block plantations could be eventually developed to supply different products (e.g. wood for construction and fuel, fodder, gum-arabic) and service functions (e.g. land rehabilitation, soil fertility restoration). They should only be tried where the determination of the implementing organization to protect and manage the plantation is adequate. Massive reforestation seems to be unrealistic. In rain-fed areas, because of low and highly variable rainfall, any exotic species will either fail or production will be so low and would be uneconomic on most sites.

- ***Acacia* plantations in agricultural rain-fed area**
  Fallow system is practiced on rain-fed agricultural land. The period the land is cropped and the period it is under fallow depend upon soil fertility, labor availability and land tenure. On fertile clays, there are areas that have been under continuous cultivation for 50 years. On the less fertile sand of the central rangelands, the land is cropped for two to ten years (usually 6 or 7) and then left under fallow for a minimum of 15 years (Leslie, 1989). However, it is commonly accepted that in the arid and semi-arid regions of Africa, shortened fallow periods and intensive harvests of fallow biomass undermine the ability of the fallow to restore soil fertility. So there is some potential for introducing planted tree fallows in rain-fed agricultural areas where site conditions make tree planting worthwhile. One potential solution is to promote the plantation of native, under-utilized legume tree: *Acacia senegal*, the world-wide main species for producing the internationally traded gum-Arabic. This species has potential for a wider use: fodder and wood production and service function such as soil fertility restoration (Deans *et al.*, 1999). Considering the time span between the tree planting and the gum harvesting (6-7 years) as well as the long term rotation of the plantation (20-30 years), only farmers with stable ownership will be able to adopt this agroforestry system (citation).

- **Irrigated block plantations**
  Irrigated block plantations in the inter-riverine area is expected to compete with agricultural needs in terms of land and water use unless farmers can find financial justification for the establishment of trees as a crop. The concept of harvesting and selling timber trees (e.g. *Eucalyptus camaldulensis*) in order to increase cash flow in the difficult financial period before regular crop harvesting, can generate funds in the interests of individuals. Fodder bank based on irrigated tree plantations with *Leucaena leucocephala, Calliandra calothyrsus* or other species can also be established. Trees can be planted at rather low spacing and regularly pruned at medium height (1 to 2m) for fodder production. High value timber crops for building materials, joinery and carpentry may offer a better of economic return than fuelwood for such plantations.

Live fencing

The use of live fences is widespread providing shelter for the crops and acts as boundary markers between fields. *Euphorbia* and *Commiphora* are the two most commonly used genera. *Commiphora* is established through cuttings taken in the dry season and directly planted into the ground. Establishment is successful. A wide range of *Commiphora* species are used. The wood is used for milk containers, stools and water troughs. Somali trade in myrrh, obtained from tapping *Commiphora* species, is small compared to the frankincense market. Nevertheless, production of myrrh from *Commiphora* sp. might be an incentive for a widespread establishment of live fences based on this species.
Concerning Euphorbiaceae, *Euphorbia tirucalli* is the most commonly used species. It is not browsed by cattle and can produce a very effective live fence. *Euphorbia* edges are also established using cuttings planted during the dry season. Other species used for live fencing include *Opuntia* sp., *Solanum* sp. and *Erythrina* sp. *Opuntia* sp. is so heavily armed that it is an effective fence even when fairly low. Other species can be used such as *Parkinsonia aculeata, Leucaena leucocephala, Caesalpinia pulcherrima, Acacia letta* and *Acacia mellifera,* to provide shelter as well as fodder. Live fences can be supplemented with dead branches of Acacias.

Windbreaks

Wind erosion is particularly important in Southern and Central Somalia where there is little relief to provide natural shelter. A well designed shelterbelt or windbreak will significantly increase yields of some crops, mainly through reducing water loss by transpiration but also by decreasing mechanical damage by the wind. In a study from Northern Nigeria, millet and groundnut yields were increased by 88% and 148% respectively, thanks to windbreaks, but cowpea yields were diminished by 70% (Leslie, 1989). In citrus orchards, fruit drop, defoliation and breakage of branches are important forms of wind damage.

The shelterbelt or windbreak can be productive; thinning can provide poles and fodder. On the flat riverine plains, there is extensive use of shelterbelts (Leslie, 1989). These are of simple design consisting of one or two lines of trees -usually the same species- protecting banana plantations. The most used tree species on the Southern riverine areas are *Casuarina equisetifolia, Conocarpus lancifolius, Azadirachta indica, Eucalyptus camaldulensis, Thevetia peruviana, Cassia sp.* and *Leaucaena leucocephala.* Species like *Dalbergia sisso, Albizzia lebbeck, Eucalyptus camaldulensis* and *Leucaena leucocephala* showed a high growth within shelterbelts established around irrigated crops in the Gedo region (Kassimani, 1987). *Leucaena leucocephala,* which provided good poles and fodder, got more attention.

Plantation grazing

On the Shabelle, livestock, mainly cattle, is often allowed to graze under fruit trees such as mango and coconut (Leslie, 1989). This practice is based on a complementary relationship for resource use between farmers and pastoralists. It keeps the grass down and gives the cattle dry season grazing. This practice may be extended concomitantly with improving fodder production in plantation systems.

Rangeland management

Experiences from the North (Somaliland) have shown that a sustainable range and pasture management can occur if stakeholders from the immediate vicinity of the range establish pastoral associations in order to promote high livestock productivity and fodder production in conjunction with water and soil conservation measures.
Dry season rangeland improvement can be increased by planting fodder trees and grasses in the drainage zones, also in the oases and around barrages in North and Central Somalia.

Fodder production for different purposes

Animal nutrition needs to be improved, especially for dairy (camel and cattle) and meat production (sheep and cattle). Furthermore, there is a need to increase the potentialities of fodder production in certain areas (e.g. high concentration of livestock near the ports for slaughterhouse and quarantine, possible development of a milk industry in the north of Mogadishu?). In this context, food-crop residues and agro-industrial by-products are often important but not sufficient to feed livestock. Market–oriented pasture reserves (natural grass or fodder crops) should be favored. On irrigated and rain-fed areas, local grass species *(Cenchrus ciliaris, Sporobolus robustus*) or exotic legume and grass species (*Stylosanthes spp, Vigna unguiculata, Chloris gayana, Atriplex sp, Andropogon gayanus*, etc.) could be sown. Also, on irrigated land and to a lesser extend on rain-fed land, fodder shrubs (*Cajanus cajan, Sesbania sesban*) and trees (*Calliandra calothyrsus, Leucaena spp.*) can be cultivated

along internal boundaries, external field boundaries, along contours or around the homestead. *About 500 Calliandra shrubs are sufficient to supplement the fodder of one dairy cow with 6 kg fodder every day over a lactation period of 10 months. Due to its good fodder traits, over 100 000 farmers in East and Central Africa now grow Calliandra* (Jama, 2004). While producing fodder, it also provides firewood, fencing, boundary planting, soil erosion control, and stakes for climbing beans.
Doum palm (*Hyphaena coriaceae* and *H. benadirensis*) were formerly found in moderately extensive, pure stands along the Jubba River. Chemical analysis of the fruits showed the milled pericarp to be rich in sugar, fats and minerals, and also to be a valuable source of supplementary feed for livestock (Bowen, 1989).

Sand dunes fixation

Large moving sand dunes are a major problem along the Eastern Somalia coastline and central rangeland. Sand dune fixation received enhanced political support in the past. The techniques of sand dune fixation seem to be reasonably well understood in the context of Somalia (Fagotto, 1987). Panels woven from palm leaves, lines of *Commiphora* cuttings, dead branches inserted in the sand, provide protection to the newly planted tree seedlings (*Casuarina equisetifolia, Prosopis juliflora)*. Isolated cashew trees planted in the sand, dune slacks have grown well too. But stabilization is achieved at a high cost and hasn't materially reduced the areas of active sand dunes (TFAP, 1989). It seems that more effort could be done to manage the currently stabilized sand dunes in order to prevent them from becoming active again. Self regenerated trees such as *Acacia tortilis, Dobera glabra, Terminalia polycarpa* are left from the natural bush land by settled pastoralists on sand dunes near Mogadishu. The prickly pear *Opuntia* is commonly grown on the dunes around Mogadishu. When sand dunes threaten developed infrastructure or agricultural land, and not only low value land, meaningful management with or by local populations should be achieved more easily.

Soil stabilization around dams, wells, irrigation infrastructure

In the North-West of Somalia, *Conocarpus lancifolia* is planted along irrigation canals to reduce erosion. Grass often develops underneath and is harvested as fodder. In the same area, *Prosopis chilensis* is grown on the edge of terraces to stabilize them. When mixed with other vegetable matter, the pods are fed to livestock. Other species can be introduced for different uses.

Forest trees for food supply

In the oasis gardens in the North-East, indigenous fruit trees *Ziziphus spinachristi* and *Grewia tenax* are left when the natural vegetation is cleared. Different trees and shrubs can be cultivated in gardens to produce edible leaves (*Adansonia digitata*), seeds (*Cajanus cajan*), and young shoots (*Borassus aethiupium).*

Intervention methodology to develop tree plantations

In order to successfully establish live fences, windbreaks, small-scale woodlots and fodder banks, tree plantations will require efforts from different stakeholders. Any intervention would have to provide long term technical advice to tree farmers and nursery managers. The main tasks of the technical advisor would be as follows:

- Training and technical help for nursery managers in:
  - Seed germination and seedling cultivation
  - Installation of appropriate irrigation systems and in the sheltering of plants
  - Grafting methods
  - Plant marketing

- Technical training to tree farmers in:
  - Planting techniques
  - Tree maintenance and protection
  - Harvesting methods of tree products
  - Marketing of tree products (wood or non wood products)

Regular meetings with all participants about failures, successes and problems occurring in projects should be held to assist the exchange of information and experience.

2.3.5. Priorities

- A general agro-ecological zoning must be carried out throughout the country in order to identify homogeneous land use systems and related constraints and development needs.
- Training adequate professional and technical staff and extension agents in the areas of pastoralism, horticulture and forestry. For that purpose a manpower requirement survey is required.
- Looking for conciliation between farmers and pastoralists for land use;
- Facilitating the establishment and strengthening of pastoralist organizations and associations based on traditional authorities;
- Addressing the problem of charcoal production which is a major cause of land degradation (Re-enforcing the charcoal export ban);
- Developing alternative energies as charcoal (gas, fuel, kerosene, solar energy);
- Identifying alternative opportunities of employment in the non-pastoralism sector;
- Creating new nurseries and supporting already established ones with different objectives according to the area (tree seedling production, shrub and grass seed production, establishment of species trials and demonstration plots).
- Regarding rangeland, livestock and agroforestry management, priorities to the different intervention strategies listed before need to be defined in relation to the different stakeholders and target beneficiary groups in the different regions.
- A State of the Environment should be assessed regarding vegetation, wildlife as well as soil and water resource dynamics. An inventory and an evaluation of the management of different water points are needed. Vegetation studies using remote sensing and field inventories are also required. Little is known about the standing woody biomass per ha in the various classes of woodland and less is known about the annual increment. Does annual wood increment exceed off-take for domestic consumption? Considerably more detailed inventory work and studies on vegetation and rehabilitation potential are needed before specific recommendations for rangeland management can be made.

2.4. Agro-Food Sector

It may seem paradoxical to divide the livestock industry into two separate sectors: one concerned with resources and the other with animals, but as the second comes under the downstream heading of the agro-food industry, it is justified by the importance of the choice of valorization for meat exports, i.e. live animals or carcasses, an option which requires substantial investment in slaughtering equipment.

2.4.1. Sector review

Agro-Food Industries Review

The food production industry played an active part in Somalia in various sectors such as slaughtering, canning industry, and grain processing. Some of these sectors which originated for historical reasons, such as pasta-making, could survive. This does not however prevent addressing the relevance of their activity in relation to the criteria mentioned below.

The revival of the food production industry will become more and more relevant with time after normalization, then by giving priority to supplying the population with food and by restoring the State's authority. As always, the relevance of investments will have to be checked beforehand by determining price fixation, internal and eventually external solvent demand, competitiveness factors inherent to Somalia, and finally the predictable stability of the market. Great care should be taken to avoid developing sub-sectors that might end in failure due to dumping operations by some countries that have not yet entirely abandoned their export aid system.

Activities that existed and used to thrive in past contexts should not necessarily be rehabilitated in the face of change.

Animal husbandry plays a major part in Somali exports and we will therefore give priority to this sub-sector.
The following observations do not constitute a study of the sub-sector. Their intention is to provide a line of thought to enable more in-depth study of the sub-sector.

Three activities of the food production sector should be focused on primarily:

- Slaughtering
- Milk conservation and processing (camels, cows, small ruminants)
- Valid certification for live animal products

Main activity regarding grain: Storage

Slaughtering

Slaughtering policy is closely related to the optimum use of the products. Several options deserve to be discussed: Live or carcass export; Live or carcass internal marketing; Transparency of market prices.

- Live or carcass export

In the last century, the Somali sub-sector of cattle export to the Arabian Peninsula and, to a smaller extent, to other Muslim countries, was highly developed. Profit increase from oil helped to support the demand for meat products specific to these markets. Thus, the promotion of live cattle was the best approach.
Statistical data exist to show these facts. Unfortunately, the adoption of liberal values denies direct access to this information. The procedure (filing a request, evaluation of such by the appropriate agency, getting price quotations, quotation agreement, assigning and executing tasks) is not compatible with quick conclusions. Thus, to explain the choices made, an indicator in open access is used from the Ministry of Agriculture and Forestry of Statistics of New Zealand. New Zealand, as well as Australia, are the main suppliers of the Arabian Peninsula in animal products. Only these two countries export live animals to this destination.

Annex 4 shows the part held by animal husbandry in relation to total exports (in New Zealand Dollars).

Annex 5 shows the evolution of values between 1984 and 2004 using an index-based measurement system with 100. The entire sub-sector reached 259, while that of carcasses increased regularly to reach its maximum peak (266) in 2004. The live export index is more subject to fluctuations and reached 300 in 2004. The peak in 2000 is probably due to the fact that Somalia ceased its exports to Saudi Arabia for sanitary reasons.

New Zealand and Australia are developing live exports faster than carcass exports to the Arabian Peninsula. Although the former countries are more distant geographically, their live exports are thriving. Somalia, which is located closer, could benefit greatly from the close proximity of the market. However, it is essential that efforts be made to meet all sanitary guarantees requested by Saudi Arabia.

Following the closure of the Saudi Arabian market due to the last epidemic of Rift Valley fever, the adaptability of the commercial market, confirms the importance of live exports.

Statistical data available on the activity of two export ports have been completed within the framework of the present study. Synthesis is also available in annex 8.

Annex 6 provides information on the number of livestock exported from the port Berbera between 1994 and October 2006.

Maximum activity was reached in 1997 (2.9 million heads and an index of 164), and minimum activity occurred in 2001 with less than 8000 heads and an index of 4. The activity increased progressively and reached over 1.7 million heads in 2005 with an index of 66.

Annex 7 provides information on livestock export quantity from the port of Bossasso between 1994 and October 2006.

Maximum activity was reached in 2005 with over 1.7 million heads and an index of 488. The 2001 global market drop affected the livestock market in a minor way; even though this market boomed in the following years.

Annex 8 recapitulates the previously presented data.

Combining the export activities of both ports, the results show a maximum in 1997 (3.5 million heads and an index of 162). Export activities slowed down in 2001 with 669 thousand heads and an index of 31. Then the activity restarted again and in 2003 it exceeded that of 1994, reaching in 2005 2.9 million heads, with an index of 135. The reorganization of commercial circuits helped maintain significant live export activity even in a context where private slaughtering units might have posed a threat.

The dynamism of Somali commercial circuits greatly helped overcome the handicap that followed a major sanitary crisis. In a context of higher sanitary safety, the live export circuit would become even more competitive against carcass circuits.

- Live and carcass internal marketing

The population still owns little refrigerating equipment; carcass refrigeration is therefore unnecessary at the local slaughterhouse level. This expensive technique must be restricted to exports. In addition, the road infrastructure, essential in refrigerated transport, remains limited. This modern, little developed infrastructure implies that the slaughterhouses should not be built in production areas, but near consumer centers.

If a slaughter unit aims at exporting, it will need: (1) to have easy access to sea and air transport means and (2) to be located far enough from northern ports, which specialize in live export. Thus, the retailers, who sell for the slaughterhouses, will mobilize their capital faster, which in turn will compensate somewhat for the lesser valorization of the animals.

The various elements mentioned above indicate that Mogadiscio possesses enough qualities needed to renovate slaughterhouses and bring them to a suitable standard for exporting. Large urban centers require less sophisticated units for local use. Unfortunately, there is no need to have six industrial slaughterhouses specialized in exports in Somalia.

- Transparency of market prices

Farmers' low information level of cattle and meat market prices represents a factor of low valorization of their products. Commercial cattle circuits are ruled by mandatory steps: markets, quarantines, ports, slaughterhouses, and various controls. These activities are recorded as statistical data and it is therefore possible to follow them and to improve their diffusion thanks to satellite telephones.

Camel Milk Processing

Because of its sanitary status, this market is still closed to Somalia for many years to come in regards to Northern countries, which host large populations with high purchasing power who would like to consume the various forms of camel milk: raw, curdled, dried, or fermented.

This market mainly consists of embassies' staff, bourgeois in exile from their camel breeders' countries, people who resided temporarily in these countries, consumers of organic foods…

While waiting for its sanitary status to improve, Somalia can hope to access the markets of Persian Gulf States through bilateral negotiations on technical and sanitary conditions to be met. Small processing units could thus be created in relation with suburban dairy camel milking units. These exports will face competition with industrial milking and processing facilities in Saudi Arabia or even Israel. Market study will be essential to check the feasibility of such processing units. The studies can be conducted well before the internal demand is met and exporting becomes a plausible solution to stimulate Somali production. The successful experience of Mauritania shows that a processing unit (in this case a mini pasteurizing unit) will not be in competition with fresh dairy product prices. This processing tool should only be conceived as a means to stimulate local production and bring in revenue. The organization of such units will need to take the input supplies of suburban milking units into account, mainly regarding animal feed.

Small processing units could have a positive impact on farmers' income in such a way that their production increase would largely compensate for the effect of a lower retail price.

Grain Storage

Since Egyptian Antiquity, State intervention in food safety has been one of the State's main responsibilities. In Somalia, the use of food as a weapon has been utilized during troubled times, and current restoration of strong State authority is insufficiently established to protect grain silos from theft and greed.

In the future, once internal security will be well established, a storage policy should be planned out. It will then become possible to develop a policy to regulate markets and food safety. This policy will use imports in order to constitute food reserves. It will ensure that these imports do not compete unfairly with local production, which it will boost through purchasing crop excesses in order to provide a maximum of farmers with decent incomes. Such a policy can only be developed outside of the private sector: trade offices, semi-public companies…

At the present time, and until internal security has been established for the long term, the grain storage policy will be based on advice to farmers, and on small storage equipment on farms.

Livestock sector review

Agricultural output in Somalia is predominantly livestock production.

Large livestock farming industry

Somalia ranks as a great stockbreeding country with livestock production as the main economic activity. The most widely bred species are ruminants, poultry appearing to account for little.

The data below on stock numbers and agricultural output are drawn from FAO databases, the major world references for countries' output and trade in agricultural products in general.

Output requires going back to 1991 to obtain information which is just an estimate and of unreliable validity.

Animal populations are very large (table 5).

Table 5: livestock stocks in Somalia for the past years (FAO directories 1982, 1992, 2002)

	1979-1981	**1989-1991**	**2000**	**TLU***
Cattle	4,437,000	5,000,000	5,100,000	3,825,000
Camels	5,883,000	6,600,000	6,100,000	7,320,000 (1.2 TLU/camel) 9,150,000 (1.5 TLU/camel)
Sheep	10,467,000	12,783,000	13,100,000	1,965,000
Goats	17,267,000	17,600,000	12,300,000	1,845,000
Poultry		3,000,000	3,000,000	
			Total TLU	**16,785,000**
			Mean	3.8 to 4.25 ha/ TLU

* TLU: Tropical Livestock Unit

Camels are the main species in the animal biomass and their population is the biggest in the world. Cattle, goat and sheep numbers are also high, though these populations are not so remarkable on the African and world scale.

These stocks seem very high. The calculation of the carrying capacity, with the reference to tropical livestock unit (TLU) with the equivalence of 1.2 to 1.5 TLU for a camel (Somali camel have a high weight), 0.75 for cattle, and 0.15 for sheep and goats, gives as an appreciation of 26 to 24 TLU/ha (mean: 25 grazing and browsing TLU/km²). This means carrying capacity was established considering the total area of Somalia, but pastoral zones represent 67% of the country and agro-pastoral area with association of agriculture and livestock around 30%. The actual carrying capacity should therefore be greater than the figures above.

These calculations would seem to show that the stock numbers above reported by the FAO are overestimated. The limited potential of the grazing biomass in pastoral zones and the resources of the agro-pastoral areas only appear to support capacities of around 11 LSU (Livestock Unit) per km² in the pastoral zones and 14 TLU/km² in the agro-pastoral areas. The theoretical potential should therefore be 7,480,000 TLU, less than half the stock numbers reported by the FAO.

This comparison of stock declared by international organizations and the “theoretical” global capacity shows the necessity for a realistic estimation of Somali livestock numbers. If the numbers reported by the FAO were accurate, the pressure on pastoral resources would be seriously endangered by overgrazing of pastureland vegetation.

Some authors have drawn up estimations which amount to half those of the FAO and seem more realistic.

An undisputable census of stock numbers is difficult to make owing to herd movements, which herdsmen organize to keep pace with available resources (grass and ligneous fodder, water) without troubling themselves about national frontiers. However, studies with head

counts, records of structure and dynamics data in demarcated areas would certainly provide the real knowledge of stock numbers necessary for making forecasts on livestock production.

Wide differences in livestock types across the regions

While the husbandry systems all seem fairly similar – most of them are pastoral – there is a wide difference in species distribution, though all of them are found throughout the land. Camel farmers are mainly located in Somaliland and the central region. Small ruminants predominate in Puntland and the central region; while cattle are mostly bred in the south-west between the two rivers (Juba and Wabi Shebelli). The latter are in a more favorable agro-climatic zone for fodder resources and can enter farming areas where they have access to straw and agricultural by-products and other residues.

Livestock production is difficult to assess accurately

Data on livestock productions reported in the FAO directory of agricultural output (1992).

Table 6: Estimation of meat and milk production in Somalia (FAO, 1992)

	Mean Carcass weight (kg)	Number of slaughtered animals	Meat (MT)	Milk (MT)
Bovine	110	540,000	59,000	530,000
Sheep	13	2,900,000	30,000	32,000
Goats	13	2,900,000	38,000	

Production of poultry meat is estimated at 3,000 tones; camel meat production is not assessed.

Overall, meat consumption is estimated at 19kg/head, a high average on the African continent.

In addition to meat and milk is production of leather and hides which is not assessed.

However, these figures are based on the estimates of livestock numbers, so their value is limited.

Livestock production is a source of foreign currency for the country through export, which is mostly of live animals. This is partly due to slaughtering customs in Islamic countries and partly to a decided lack of infrastructural equipment for slaughtering and carcass export.

But here again, it is difficult to obtain accurate figures on animals exported from Somalia which were bred there. Exports from the Somali ports of Berbera and Bosasso between 1993 and 1997 increased from 650 thousand animals in 1993 to 1.4 million animals in 1997. However, the estimates of the number of animals exported vary considerably. While FEWS (1998) estimates total animal exports through Berbera in 1996 at about 1.3 million animals, Ahrens (1998) refers to a "Somaliland Two Year Development Plan" which lists for the same year and the same port 2,480,090 animals (2,372,656 sheep and goats; 64,606 cattle; 42,828 camels) at a total export value of US$155.6 million (Cited by Pratt and al., 2004). The same UN report referred in the Ahrens report also refers to other sources establishing that Somaliland's total turnover for the year 1996, including also minor ports was 3.6 million heads and in 1997 more than 2.7 million heads were exported to Saudi Arabia and the

Emirates. Somaliland's annual earnings from livestock are estimated over $200 million every year (more than Ethiopian coffee exports in 2001).

According to Ahrens (1998), of the livestock exported annually through Berbera port, between 60 per cent (according to "Somaliland" sources) and 80 per cent (Ethiopian sources) are of Ethiopian origin (Table 11). Prices paid for animals in Bassosso port are lower than in Berbera due to the greater distance from importing markets. Livestock from the south of the Somali Region headed historically to Mogadishu but during the civil war they were diverted to Bosasso. Livestock from Moyale are mainly delivered to slaughterhouses in Nairobi (FEWS, 1998). The majority of animals sold for export, mainly to Saudi Arabia, are males of the "Somali black head" or "fat-tailed sheep", followed by male goats, male cattle and young male camels, which are exported mainly for meat (Ahrens, 1998) (Alary, 2006).

Animal health situation

- Context

  - *A poor health situation*

    Though the unsettled conditions in Somalia have prevented the health situation from being properly monitored, it is established that there are infectious and parasitic agents causing serious harm to livestock within the country, notably plague in cattle (though not always with highly pathogenic serotypes) and pleuropneumonia in small ruminants: Rift Valley fever, PPR, sheep pox, etc. and in all even-toed ungulates, foot and mouth disease, camel trypanosomosis, etc. There are many anthropozoonoses, the main ones being Rift Valley fever (RVF) already mentioned, tuberculosis and brucellosis.

    It is thus necessary to put priorities in the right order. Choice of criteria could be economic factors, public health, technical expediency, possibility of funding by backers with a range of reasons for supporting disease control in Somalia.

    In this respect, though the European Union has so far favored a siege attitude focusing its protection on a fraction of territory by its borders like the buffer zone in Turkey, it should be pointed out that there other strategy options. Like the United States which, for its own protection, has funded foot and mouth disease control in far distant countries. The Arabian Peninsula controls health risks from Asia and Africa by concentrating on import flows. African imports go through the Horn of Africa, and largely through Somalia. Saudi Arabia has a foot and mouth vaccination policy which slows the progress of the epidemic to Europe. Eradication vaccination in the Horn of Africa would be a much more efficient insurance for western countries. Cross-ship contamination of sheep from Oceania has already been observed in Jeddah. Furthermore, the fact that there are perfectly thermostable vaccines for an increasing number of serotypes allows us to think about the advantages of more offensive policies. These mid-term prospects could inspire the Somali authorities in international negotiations.

Table 6: Main pathologies identified in Somalia

French name	English name	Somali name	Notes
Charbon bactéridien	Anthrax	kut	
Babésiose	Babesiosis	kathidik	
Brucellose	Brucellosis	godo–welech	*B. melitensis, B. abortus*
Lymphadénite caséeuse	Caseous lymphadenitis	mal–qaaxo	
	Blackquarter	etaiser	
Péripneumonie contagieuse bovine	Contagious bovine pleuropneumonia (CBPP)	sambab	*M. mycoplasma mycoides*
Pleuropneumonie contagieuse caprine	Contagious caprine pleuropneumonia (CCPP)	sambab	
Ecthyma contagieux	Contagious ecthyma	bog	
Enterotoxémie	Enterotoxaemia	darato	
Fièvre aphteuse	Foot and mouth disease	habeb	Types found: O, A, SAT1
cowdriose	Heartwater	hulumbe	
gale	Mange	addho	
	Nairobi sheep disease	hulumbe	
Pasteurellose	Pasteurellosis	qarir	
Peste des petits ruminants	Peste des petits ruminants (PPR)	Susun	
variole	Pox	furuk	
rage	Rabies	wele	
Peste bovine	Rinderpest	tabakarrup	Mild strain: African type 2, suspected in south
Trypanosomose	Trypanosomosis	dukaan,mallaig	*T. evansi, T. congolense*
Fièvre de la Vallée du Rift	Rift Valley Fever (RVF)		

- *Responses adapted to the context*

  Faced with the difficulties its exporters are up against, Somalia has conducted bilateral negotiations with Saudi Arabia to define an acceptable protocol to prevent humans from being contaminated by RVF. A quarantine system has been introduced for a minimum certification of the non-contagious status of exported animals. An operational minimum system is up and running in ex-Somaliland.

  A number of studies have established the impact of banning exports of Somali livestock. In 2004, the World Bank assessed the average loss of added value at 39% to 50% depending on the category of farmer following the ban on Somali livestock. In the context of livestock farming infrastructure renewal, installation in the hinterland of centers, parks and channels for vaccination, quarantine and diagnostics laboratories is easily justified. Bilateral negotiations with potential importing countries would help to define realistic and acceptable certification conditions.

- *Geographical factors*

  Transhumance and trade movements and ecological groups are the basis for a definition of consistent units in animal husbandry and proposing to the OIE regionalization of sanitary statutes per consistent unit defined. This would enable regions which make better health progress and those which are fortunate enough to escape epidemics to gain easier access to international exchange.

- *Personnel problems*

  Good veterinary surgeons have been trained in both in Somalia and abroad but unfortunately most of them have emigrated and only about 25% of them are still in the country. Other countries have also experienced this situation but most of their qualified people have returned, not for financial reasons but for several other ones: sentimental attachment to their roots and culture and above all because of commitment to a motivating program of consistent actions to support livestock farming in their countries.

  The Somali diaspora has a tradition of aiding their native country, so to support and control action programs of short duration, there should be an effort to rally émigré veterinary surgeons preferably with international expertise.

- *Available vaccines*

  In pastoral zones in countries where livestock farming makes a significant contribution to gross income, it is not possible to control disease by slaughtering affected animals. Eradication can therefore only be envisaged by vaccination policies. With regard to Somalia, the characteristics of the ideal eradication vaccine include resistance to heat and the capacity of distinguishing contaminated animals from vaccinated ones (a definite advantage for export certification). There are vaccines which meet these criteria but, though developed, are not yet on the market, such as thermostable foot and mouth vaccines (not fully developed for all serotypes) which allow for differentiating between contaminated and vaccinated animals, an original RNA vaccine in the test phase at the CIRAD, which acts against several viral diseases including rinderpest. Depending on the vector used, this vaccine can be very heat-tolerant and will lead to non-rinderpest certification for export. In the long run, it will be less costly than the weakened rinderpest vaccine currently used.

- <u>Lessons of other countries' earlier actions</u>

  - *Privatization*

    The density of human and livestock populations in most of the country is too low to expect mainly private stakeholders to run a health system. Controlling big epidemics with epidemic watchdogs and vaccination campaigns in a country with areas where there is no special tradition of vaccination requires careful thinking on the part of the national authorities and the livestock farming industry. There should be no dogmatism about it; it has been noticed that some capitals have acquired inflated numbers of vets in the aftermath of privatization, the profession having almost entirely deserted the hinterland. Sometimes private practitioners behave like "farmers general of vaccination" earning their income through teams of vaccinators while staying in the capital.

  - *Import of veterinary drugs*

    In some countries privatization has led to vets focusing on the most profitable sectors, such as import of veterinary drugs. In the absence of a veterinary network to retail the drugs, these importers responded to the farmers' demand by selling drugs to anyone who could afford to buy them. This practice led to a black market in drugs which spiraled out of their control, especially with regard to quality.

    It is essential for livestock farmers to have access to veterinary drugs. Innovating solutions should be devised to avoid any harmful consequences

2.4.2. Identification of problems

These are partly general ones due to the absence of a state to safeguard assets with a high strategic or economic value and partly technical ones. The main problems in the agri-food industry are lack of data on existing stock, severe competition from food donations and goods exported using subsidies from rich countries.

Health restrictions: the inadequacy of the animal health system still hampers effective prevention of epidemics in spite of aid programs. The PACE and PARC programs (FED-funded) are still not properly up and running in large parts of the country. In particular, the rinderpest virus is still known to be active in the south-west (van Kluster, 2004) which remains a zone where the disease is endemic whereas many countries in Africa have been declared free of it.

Other diseases of international importance placing restriction on trade are:

- Rift Valley Fever, a zoonosis mainly affecting sheep, which has already made an impact through the official ban on live sheep imports to Saudi Arabia;
- Foot and mouth disease, also found in many neighboring countries, which is extremely restricting due to the regulatory aspects of both live and carcass exports.

There are also other diseases (e.g. trypanosomosis) but these have a lesser impact on trade in animals and products.

The second great hindrance to the development of livestock production is feed. Grazing land is not very productive and its energy and protein content is low in dry seasons. Supplementation with agro-industrial by-products is limited due to low production of bran, oil cakes, etc.

Outside the export markets, farmers and businessmen are inadequately structured.

2.4.3. Objectives

- Assess existing systems to identify the most effective structures and processes in the Somali context.
- Use the opportunities raised by regionalization to compare the performance and cost of specific intervention policies between pilot zones.
- Support livestock farming incomes.
- Classify pathologies in order of importance to control them based on predefined priorities.
- Divide the country into zones approved by the Office International des Epizooties.
- Develop a workable certification system.
- Increase the milk offer.
- Ensure distribution of market price lists
- Improve cereal storage

2.4.4. Intervention Strategies / Logical Framework

Global objectives

- Improve livestock farming incomes at farm and export level
- Improve availability of foodstuffs

Expected results

- Better health situation;
- Greater valorization of exports;
- Stakeholders better informed on market prices;
- Increased income for producers;
- Domestic food offer increased;
- Locally trained technical staff.

Activities

Priority should be given to research:

- Evaluation of current actions, identification of efficient elements;
- Studies of the market and competition factors in the agri-food industries;
- Study of veterinary structures and their intervention policies prior to renewal.

Other urgent measures to implement are described below.

In the agro-food industry

Mogadishu has a number of suitable factors enabling slaughterhouse renovation to the level required for export approval. The other big urban centers have simpler units confining them to the domestic market. Unfortunately there is no outlet for 6 industrial slaughterhouses for the export market in Somalia.

The creation of camel milk dairies will have an impact in the short term on farmers' incomes owing to increased production which will more than amply compensate for the drop in the sale price. In the medium term, these units should enable them to gain shares in the sub-regional market.

The only immediate action with regard to the grain industry is to generalize on-farm storage systems.

In the livestock farming industry

Immediate actions can be taken to support current practice and more fundamental actions can consolidate their quality and sustainability.

- Immediate actions

  These involve short eradication vaccination campaigns covering the entire vulnerable animal population throughout the country. This will require giving the veterinary services

the logistics equipment they need: vehicles, means of cold storage, technical instruments. At the end of the campaign(s), all the equipment will be returned and stored in places specifically for each zone defined by geographical criteria (its ecology, communication infrastructure, administration, etc.) and human criteria such as the capacity to guard the equipment out of the reach of inevitable temptation.

- Actions to renew animal health services

  This fundamental action is designed to provide the infrastructure required to support the operations: eradication vaccination, epidemic watchdogs and diagnostics. This does not mean renewing infrastructure which already exists for this purpose. A study of needs and the short- and medium-term intervention policy should be undertaken together with the Somali authorities.

  Infrastructure density will be organized by settled and pastoral zones. In the latter, when livestock density is below the threshold density, the defining factor for installations will not be number of heads but geographical area (one for about 32,000 km²). Its quality will be adapted to privatization if this option should be retained in the medium term.

  Quarantine structures will be reinforced, if they already exist, renewed or created and join with good quality veterinary laboratories in providing the tools required for a healthy export industry.

  When they are renewed, the veterinary laboratories should operate in a network within Somalia but also be part of the regional networks to maintain a level of high quality.

- Veterinary training

  Most of the veterinary surgeons have emigrated. They cannot be encouraged to return for financial reasons so other reasons must be found. Only a project which rallies and motivates them can attract these skilled people. Since they are getting older, new training courses must be started.

  It is essential to incite collaboration for initial and continuous training of vets at the faculty of Mogadishu. Prudence dictates not sending students abroad to study in countries they find attractive and where they might be tempted to settle and therefore lost to Somalia.

  An appraisal of executives, skills and continuous training requirements is a priority.

- Central pharmacy – supplies store

  This structure is a crucial tool for ensuring cost-effective veterinary supplies. Even the most optimistic estimations of livestock numbers do not justify having several import structures. The price of drugs the laboratories sell depends on several factors of which the main ones for a specialty are: amounts ordered, buyer's reputation (supposed guarantee of payment), means of payment and deadline. For large quantities, negotiations could be held directly with the manufacturer who supplies the world-famous merchant laboratories. In extreme cases, the savings can reach 90%! Very large quantities open the way to visiting and dealing with laboratories in Asia, some of which are of good quality. In all cases, the contracts require specialty inspection. This inspection can be performed by a WHO-approved analysis laboratory. There are some with good technical and economic performance levels in Africa.

  Apart from drugs and vaccines, this structure will need to import the provender needed to develop the dairy industry and supplements. Diversification could be of interest to the poultry industry.

The central unit should have branches throughout the country. Regionalization of distribution systems should be studied. Each distribution system has its own advantages and drawbacks, so after an experimental phase of 4 or 5 years it should be possible to make an appraisal and outline the most relevant systems for Somalia. All these systems will include training farmers in the use of the products.

Since management of commercial activities by State services has not generally proved conclusive, this central pharmacy supplies store will be run by a semi-public company since it is important to preserve the option of diverting all or part of the veterinary business to the private sector.

To prevent any competition from a parallel market, this unit should be exonerated from all customs duties and taxes. To begin with, to ensure efficiency, the drugs could be sold either to farmers or groups of farmers, or else to traders for whom they would be an inward freight. This system has two advantages: it provides the intermediaries with capital and puts them in permanent contact with the farmers. Their trade could extend beyond the domestic framework. Their exports would increase the outlets and hence give the central pharmacy greater leverage with regard to supplier laboratories.

The choice of location for this unit will be decided by its closeness to export livestock farms and a port which can handle containers, so it will be in the north of Somalia.

Later, national officials, State representatives, the veterinary profession, farmers and consumers should take part in the study and preparation of the institutional framework for animal health and consumer protection by giving thought to the type of products which are allowed and the persons authorized to hold them. The authorizations can be differentiated by product category. Further thought could be given to prescription methods and possible remuneration of prescribers from the private sector.

- Market transparency

  Market price lists should be widely and immediately distributed: data transmission by satellite phone, lists posted in marketplaces and livestock services and broadcast over the radio.

- Dairies on urban outskirts

  Improvements in grazing land and genetics will take effect in the medium to long term. The need for rapid improvement in people's diet is an argument in favor of developing dairies on the urban outskirts, mainly based on camel milk. Small ruminants and even cattle could also be used, though they do not have the same advantages with regard to land use policy.

  Camel milking parlors can work only in the first half of the lactation period when the yield is the highest and therefore the most profitable in terms of labor costs and financial returns on distributed rations. For this, after birth, baby camels are adopted by mother camels in the second half of their lactation period. The "adoptive mother and baby camel" pairs are then put back out to pasture. This interaction between intensive dairy businesses in urban areas and country farms can often rely on split family groups where one group is settled, for instance so the children can go to school, and the other is in charge of roaming herds.

  The dairies should be organized to provide easier access to imported provender for dairy animals and develop by-products from agricultural areas. They should be encouraged to join a network to record performance with a view to setting up a genetic enhancement program.

To define protocols and performance recording methods for indexing reproducers, a support mission of one month with a geneticist helped by a sociologist should be planned as early as possible.

Camel dairies create interaction between extensive pastoral zones and intensive urban outskirts without detriment to the environment because animal feed is mainly imported (provender or agricultural by-products). Their milk-processing workshops will make them a link in the chain of diversified exports.

- Poultry workshops

  A large poultry industry cannot develop as long as there are still subsidies for poultry products exported from rich countries. Once these have been abolished, there will remain the problem of competing with negative value products such as chicken wings in the countries of origin.
  In the current circumstances, a few small-scale private workshops for the local high-end market will only be supported by the central pharmacy which supplies provender.

Hypothesis

- The safety of property and people is assumed to be ensured.
- No intention to apply external models takes precedence over valorization of existing Somali assets or options.

Conclusion: toward State-building approaches

Without specific actions of State building, the development programmes proposed in the previous reviewed economic sectors will not be efficient and appropriated by local actors. As exposed in terms of references, these technical actions proposed must fall under an including logical frame of State building.

Just before pointing some recommendations, we would like to stress on four preliminary and general comments about aid.

First, State-building oriented aid is not to be confused with short term humanitarian aid. Much of the international support labelled "humanitarian" is delivered outside State structures. Humanitarian agencies are used to work in insecure environments and can often reach poor people and provide services when others cannot. But humanitarian assistance is not effective in laying the foundations for longer-term development. It can also undermine state capacity by, for example, mobilising scarce skilled personnel away the domestic public sector.

Second, to be effective, aid for State building should be delivered through long term coordinated programmes. It does not need a large and sudden flow of money that the country could not absorb, but harmonisation of the aid agencies and predictability of the means.

Third, priorities should be defined and activities have to be engaged following a logical frame. For instance, security matters enhancing protection of the people and their property should be addressed before improving productive sectors or public management.

Four, aid intervention for State building should be selective and adapt itself to the different regional/local institutional frames and crisis situations inside the country.

The following concluding section highlights some main tracks of work for State building approaches in Somalia that should be thorough. Six major issues are listed:

- Producing knowledge of the political economy
- Adapting intervention to regional contexts
- Promoting sovereignty
- Promoting a peace economy instead of criminal economy
- Including local powers
- Including advanced groups of the Diaspora

1. Producing a fine and accurate knowledge of the political economy of violence

Violence in Somalia is underpinned by different sorts of motives: it has multiple rationales and has had multiples local impacts.

First of all, the war situation shifted into 15 years, passing from a fight for the control of the State apparatus into a multiform conflict, in which the localised territorial stakes, the control of the principal productive assets, the competitions between businessmen were the principal engine.

The various stakeholders must struggle continuously to secure the funds required for their political survival. This competition focuses on the control of taxable entities such as property and income – generating infrastructures (e.g. harbors, airstrips, markets and trade routes).

This system has led to the privatization of economic, social and public goods to the detriment of the whole population. The war led also to the criminalization of the economy, with the proliferations of gangs, informal racketing checkpoints in most Somalia south-central towns and rural areas.

Understanding the political economy of violence is a key point for a better and productive allocation of aid. Because aid should be allocated to feed a peace building processes and avoided the feeding of violence through his capture by gangs and patronage networks.

2. Adapting interventions according to the various regional institutional contexts

All political situations in Somalia did not witness the same picture of violence and crisis.

Somaliland not only managed to stabilize, to disarm and to establish enforced security conditions favouring the protection of people and properties, as well as economic growth. It developed also a process of democratisation. Presidential elections held in 2003 (with a President elected with a slim margin) and parliamentary elections in 2005.

Puntland (Northeast Somalia) have achieved peace stabilisation. A President has been elected in 2005 and local administrations are working.

In both areas, aid priorities should be given on the empowerment of local initiatives, capacities building and training (two universities operate in Somaliland), improvement of productive sectors and infrastructures, as well as enforcement of security process and local institutions.

In most of *South-central Somalia*, it seems that *improving of security and the formation of state security services accountable to civilian control is a precondition to any other action.*

3. Promoting sovereignty through aid interventions

The aid system has often underwritten the creation of a dual bureaucracy, whereby nationals of a country work in an underpaid and under-resourced national system, while a more privileged segment works for international organisations.

Unsurprisingly, there is a brain drain from the government to menial positions in the aid system. Such process undermines State capacity.

International aid should contribute to the recruiting and supporting of skilled State civil servants according to transparent procedures.

4. Promoting a profitable economy of peace rather than a profitable economy of violence

The criminalisation of the economy began in the late era of Siyaad Barre's military rule, but it developed dramatically during the civil war, mainly because of the lack of State regulation. A general context of non-right prevails and it should be noticed that such a context may be wished and maintained by some leading warlords and businessmen. It should be noted as well that in the current situation the valuable assets have been confiscated by the most powerful.

In such situation of non-right, international aid is likely to be diverted by the most powerful for their own profit and to be used as social controls tools or patronage instruments.

The development of policy of security remains a precondition to the introduction of economic development actions. It must allow the inclusion of some despoiled vulnerable groups and engage a process of land and properties restitution.

Beyond these prospects, the promotion of a legal (or at least peaceful) economy as opposite of criminalized ones could be posted through the following actions:

- A marked economic and technical support from the international assistance for local initiatives promoting peace buildings and democratisation, in particular with Puntland and Somaliland.
- The mobilization and organisation of key economic drivers and businessmen through the revitalization of "Chamber of Commerce and Industry". Most Somali export traders need to join their common interests in order to weigh on foreign markets.
- The nationalisation of ports and airstrips.

As a general political message from the international community, it should be asserted that profitable peace economy are supported and rewarded…while the recent history have shown that political violence generated flows of assistance.

5. Including local powers in a State decentralised process

Local "private" powers emerged on the ruins of the central State.

Some of these powers are ruling territories and the productive assets by force and for their own or to sustain their political clients. Others local/regional powers emerged for other stakes: that is to provide key services and administrations and to mitigate the lack of central State.

It seems important:

- To survey and distinguish the different kinds of local powers;
- To include in the State building process those local powers already involved in the good management of public asset. The delivery of decentralised basic services (water, veterinary, forestry, fisheries…) through these key actors may lead to a lower cost structures than the creation and duplication of a renewed administration.

Rule of law and good management of assets should be implemented and monitored by aid agencies.

6. Including advanced groups of the Diaspora

The supports of the most advanced group inside and outside (the Diaspora) are necessary to the State building process.

Many Somali fled abroad, following the national crumbles. As shown previously, the economic contribution of migrants to Somali society is clearly significant. Remittances are an important source of income in many households and have multiple effects on local economies.

Beyond supporting their family, Somalis from the Diasporas are also financing a variety of local initiatives: local NGOs, local authorities, religious organisations, schools and universities…

While these individual or collective initiatives from the Diaspora should go on, their involvements in State buildings strategies should be encouraged. Many Somalis from the Diaspora have a graduate or postgraduate background and professional expertise exerted in their host country. These skilled Somalis should be mobilised through part time consultancies in order to participate to development programmes (training, expertise and so on). Some of them could be the backbones of basic services (health, education and so on).

List of acronyms and abbreviations

ACP	Africa, Caribbean, Pacific
ARPCT	Alliance for the Restoration of Peace and Counter-Terrorism
ASLM	Agulhas Somali Large Marine Ecosystem
CBPP	Contagious bovine pleuropneumonia
CCPP	Contagious caprine pleuropneumonia
EEZ	Economic Exclusive Zone
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIS	Geographic Information System
GIWA	Global International Waters Assessment
HACCP	Hazard Analysis Critical Control Point
HDI	Human Development Index
ICU	Islamic Courts Union
ICZM	Integrated Coastal Zone Management
IGAD	Inter-Governmental Authority on Development
IOTC	Indian Ocean Tuna Commission
IRCC	International Red Cross Committee
IUU	Illegal, Unregulated & Unreported
JNA ICR	Somali Joint Needs Assessment Infrastructure cluster report
LSU	Livestock Unit
MCS	Monitoring, Control & Surveillance
MPA	Marine Protected Area
NGO	Non Governmental Organization
R/V	Research Vessel
RVF	Rift Valley Fever
SLWM	Solid and Liquid Waste Management (
SNM	Somali National Movement
SPM	Somali Patriotic Movement
SSDF	Somali Salvation Liberation Front
SWALIM	Somalia Water and Land Information Management System
SWIOFC	South West Indian Ocean Fisheries Commission
SWIOFP	South West Indian Ocean Fisheries Project
TFG	Transitional Federal Government
TLU	Tropical Livestock Unit
TNG	Transitional National Government
UAE	United Arab Emirates
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNICEF	United Nations Children's Fund
UNITAF	United Nations Task Force
UNOSOM	United Nations Operation in Somalia
USC	United Somali Congress

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Appendices

Annex 1: Water Sector - Cost Benefits Analysis

(From Hutton *et al*., 2004)

Cost effectiveness and cost benefit analysis are proving increasingly important as the equilibrium between subsidiarity and self-financing capacity, and public and private investment and management is questioned for increased efficiency and adaptability.
Costs per capita have been estimated for Sub-Saharan Africa (as year 2000 US $) as:

Action	Initial investment	Annual cost
water supply:		
disinfection at the point of use	0.13	0.33
dug well	21	1.55
borehole	23	1.70
standpost	31	2.40
rainwater collection	49	3.62
piped house connection	102	8.34
sanitation:		
simple pit latrine	39	4.88
small bore sewer	52	
ventilated improved pit latrine	57	6.21
pour-flush	91	
septic tank	115	10
household sewer connection	120	10

The following objectives have been studied concerning their feasibility and consequences:

- Objective 1: WHO MDG (halving the proportion of people without access to improved water sources)
- Objective 2: halving the proportion of people without access to improved water sources and sanitation
- Objective 3: everyone has access to improved water source and sanitation
- Objective 4: objective 3 + everyone has access to a minimum of disinfected water on the point of use,
- Objective 5: household piped water and sanitation access for everyone.

Total annual costs per capita of reached population have been estimated for the objectives 1 to 5

	Total annual costs per ca. reached pop.	Costs - benefits ratio according to conditions hypothesis:		
		worst	standard	best
objective 1 (MDG)	2.3	1.7	11.5	
objective 2	4.6	2.5	12.6	30
objective 3	7.7	2.4	11.7	
objective 4	4.8	2.9	15	
objective 5	25.4	1.1	4,8	

(The low cost for objective 4 is due to increased reached population at a little additional cost).

Main contributors to the costs are investment costs for low-technology interventions.
Among benefits, time saved for water collection accounts for around 65%, health sector costs for around 20% and children school attendance for around 10%.

But the real economic benefit may not be financial, nor immediate, given to many variables like the value allowed to time, the unemployment...

As financial possibilities exclude direct transfer from the health sector to the water needs sector, meeting of costs should involve a variety of mechanisms including state and international help, local NGO organization and self-supporting economic capacity (sustainable development).

The health sector can nevertheless play a key role in providing an educational support for behavioral changes and knowledge for decisional analysis.

Annex 2: Urban Water Supply – Short and-Medium Term Priority Interventions

URBAN WATER SUPPLY - SHORT-TERM STRATEGIC INVESTMENTS:
(Costs evaluated in Millions US $, value for year 2000)

1. Extend the hydro-geological survey on water in Somaliland to other cities and Puntland (cities to be identified) ---------- 0.10

2. Continue investments in urban water infrastructures (drill boreholes and install pipelines in cities with good municipal sector management) (target 20 boreholes first year, 30 second year. Cities = Hargeisa, Boroma, Burao, Erigasso, Bosasso, Gardho, Galkaio – 100,000 $ new borehole, 50,000 rehabilitated) ---------- 5

3. (If good management exists) implement local urban water infrastructure rehabilitation & development projects, targeting a 30% pop. coverage (South-Central Somalia, cities to be identified, 13 $ per capita), ---------- 0.10

4. Establish multisectoral water and sanitation Committees for each region to coordinate water sector regulatory framework and water services development. Build capacities of the Committees (training and equipment funding, region and zones capitals, 150,000 $ per city)---------- 2.7

5. Support creation of public/private partnership and private utilities (training workshops, 30,000 $ per city) ---------- 0.6

6. Development of a National Water Policy: further develop and enforce the Somaliland Water Policy, clarify the role of the Transitional Federal Government (of Somalia). (policy consultants, administration, 100,000 $ for Somaliland, 200,000$ each for Puntland and South-Central Somalia) ---------- 0.5

7. An additional priority for the Benadir Region (Great Mogadishu) is the reduction in the number of small water companies (actually around 500) by merging into large and medium size (workshops, administration) ---------- 0.10

8. Controlled closure of private wells within urban areas, minimizing conflict risks through compensation schemes (workshops) ------ 0.10

TOTAL ----------8.7

URBAN WATER SUPPLY - MEDIUM-TERM STRATEGIC INVESTMENTS:
(Costs evaluated in Millions US $, value for year 2000)

1. Rehabilitation / extension of urban water supply in regional capitals, targeting additional 30% of the total population (boreholes, pipelines, power sources, management... Target cities (Hargeisa, Burao, Erigaw, Bosasso, Gardho, Garowe, Galkaio, Jowhar, Kismayo, Merva, Baidoa, Mogadishu - 13$ per capita, average 910,000 per city) ----------19

2. Construction of new urban water supply in regional capitals, targeting 30% of the population (boreholes, pipelines, power sources, management... Target cities = Las Canood, Dlusa-Mareeb, Belet-Wayne, Xudur, El-Waq, Bu'aale - 7$ per capita, average 500,000 $ per city) ---------- 3

TOTAL ---------- 22

Annex 3: Solid and Liquid Waste Management (SLWM) - Immediate (2 years) and Medium Term (5 Years) Interventions

SLWM Immediate Term (Costs evaluated in Millions US $, value for year 2000)

1. Support development and strengthening of Public/Private Partnership / SLWM in order to reach up to 50% of waste collection capacity - and using labor-intensive systems (objective 40 towns > 20000 hab each - training, policy consultant, workshops, regional study tours,... around 250000 $ per city) ---------- 10

2. Support the municipal capacity building, experiment water-integrated cost-recovery systems (water tariff based taxation), in order to create self-sustained waste management systems (objective 20 towns, training, policy consultant, regional study tours,... around 220000 $ per city) ---------- 4.40

3. Construction of high quality dumping sites (semi-aerobic landfills or dump-and-burn sites), including geophysical surveys and planning exercises to identify safe locations (15 regional capitals, construction and survey - 250000 $ per city) ---------- 3.75

4. Labor-intensive cleanup operations immediately upon peace and stability in South-Central Somalia, involving Internally Displaced Persons and demobilized militia (10 cities, administration, equipment - 200000 $ per city) ---------- 2

5. Experiment in domestic septic tanks at the neighborhood level in selected urban centers as a part of a broader feasibility study (6 towns in Somaliland and Puntland, equipment, installation, training - 250000 $ per city) ---------- 2.5

TOTAL **--------- 25.65**

SLWM – Medium term (Costs evaluated in Millions US $, value for year 2000)

1. Rehabilitation/ extension /creation of drainage in regional capitals (open-air drainage construction, equipment, labor, training - 12 cities, 5 km per city - 100000 $ per km ---------- 6

2. Build additional liquid waste management systems following the feasibility study carried out previously (t. 2 Million people in Mogadishu, Kismayo, Hargeisa, Bosasso - equipment, labor: 35 $ per capita) ---------- 72

3. Regional and local waste management policies developed in all regions to regulate operations (policy consultant, workshops, administration, 200000 $ per operation) ---------- 0.6

4. Waste management systems established for large industrial production units and major industrial areas (10 units to be constructed)

5. **TOTAL** **---------- 78.6**

6. Investment in essential equipment for SLW collection in largest urban centers of South-Central Somalia, training of collect staff (± 5 cities ± 2 Million people - equipment and training 1.5 $ per capita) ---------- 3

Annex 4: Exports of Agricultural Products from New Zealand

Source: Statistics New Zealand. Table compiled by the Police Information Group, Ministry of Agriculture and Forestry

Tableau 1

Exports of Agricultural Products from New Zealand[1]

June Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
	NZ$(000)	NZ$(000)	NZ$(000)	NZ$(000)	NZ$(000)	NZ$(000)	NZ$(000)	NZ$(000)	NZ$(000)	NZ$(000)	NZ$(000)	NZ$(000)	NZ$(000)	NZ$(000)	NZ$(000)	NZ$(000)	NZ$(000)	NZ$(000)	NZ$(000)	NZ$(000)	NZ$(000)
Live animals	**60 700**	**80 200**	**114 500**	**153 000**	**188 200**	**212 124**	**193 713**	**178 901**	**186 109**	**172 087**	**183 528**	**140 554**	**138 734**	**125 365**	**140 172**	**143 390**	**176 477**	**153 736**	**158 378**	**147 820**	**182 262**
Beef and veal	634 800	953 000	691 700	1 024 500	985 000	1 279 173	1 091 585	1 283 846	1 450 787	1 418 658	1 384 168	1 160 822	1 053 657	992 300	1 176 695	1 090 577	1 403 833	1 677 714	1 820 258	1 553 535	1 826 805
Lamb	869 100	1 019 600	811 600	952 900	776 800	855 745	957 684	977 777	1 176 968	1 208 873	1 084 683	1 043 854	1 139 133	1 302 109	1 294 361	1 347 116	1 530 163	1 893 225	1 989 467	2 010 584	2 006 936
Mutton and hogget	124 600	131 100	122 700	141 500	123 700	152 064	135 780	171 818	170 868	180 120	166 016	152 810	197 865	200 776	194 807	161 709	168 602	232 605	269 130	246 214	252 413
Venison						38 430	39 849	53 402	81 252	129 779	123 616	138 474	143 236	136 776	137 668	137 968	157 498	230 164	214 802	158 220	176 250
Other meat products	76 400	124 400	105 700	143 800	331 700	110 340	110 174	125 221	151 929	149 992	156 551	167 083	174 217	142 630	137 399	144 194	173 758	226 014	220 786	202 917	265 118
Total meat and meat products	**1 704 900**	**2 228 100**	**1 731 700**	**2 262 700**	**2 217 200**	**2 435 752**	**2 335 072**	**2 612 062**	**3 031 804**	**3 087 422**	**2 915 035**	**2 663 043**	**2 708 108**	**2 774 592**	**2 940 930**	**2 881 563**	**3 433 855**	**4 259 721**	**4 514 443**	**4 171 469**	**4 527 522**
Butter	562 400	636 500	538 800	510 100	524 300	609 214	710 513	542 144	701 631	796 509	834 045	725 938	860 383	917 511	951 796	914 714	923 153	1 102 593	1 083 836	922 060	1 075 512
Cheese	235 900	256 800	267 200	276 700	286 200	319 819	341 019	357 963	412 066	497 939	527 968	604 515	617 398	838 438	898 404	983 808	990 235	1 271 951	1 417 215	1 000 608	1 035 401
Wholemilk powder	189 400	234 000	304 600	334 500	313 700	453 651	400 563	637 799	759 257	891 015	932 106	880 221	924 254	1 030 179	1 098 077	1 174 418	1 237 064	2 152 259	2 062 071	1 770 477	1 914 519
Skimmilk and buttermilk powder	205 800	271 500	236 600	260 800	280 200	457 803	581 503	449 971	473 833	436 825	483 706	488 504	516 390	650 740	608 413	611 560	635 494	1 130 958	1 177 708	866 413	950 333
Casein and caseinates	212 800	293 500	275 600	310 400	327 800	343 700	448 501	411 907	443 815	522 881	558 891	509 114	557 152	569 363	652 328	763 770	805 630	1 213 324	1 172 547	958 929	781 967
Other dairy products	20 400	24 700	94 000	70 300	44 200	29 860	28 863	20 465	23 356	- 434 097	42 338	48 323	63 676	78 525	92 684	102 142	108 744	130 950	149 953	119 302	139 213
Total dairy products	**1 426 700**	**1 717 000**	**1 716 800**	**1 762 800**	**1 776 400**	**2 214 047**	**2 510 961**	**2 420 247**	**2 813 958**	**2 711 072**	**3 379 053**	**3 256 614**	**3 539 253**	**4 084 756**	**4 301 702**	**4 550 412**	**4 700 320**	**7 002 037**	**7 063 330**	**5 637 789**	**5 896 945**
Greasy wool	448 700	551 900	412 500	474 100	571 900	651 764	418 313	261 277	307 862	196 689	217 144	306 867	249 305	239 233	227 726	196 605	225 623	293 661	277 907	251 015	236 019
Slipe wool	68 200	85 600	75 400	79 000	126 500	159 151	123 944	86 837	101 656	87 874	89 656	78 417	82 328	78 232	83 502	47 657	50 793	67 039	39 494	35 219	38 589
Scoured wool	596 400	837 700	803 000	1 023 600	936 000	984 703	772 117	613 782	671 659	615 846	747 335	867 355	702 213	628 739	603 349	498 734	522 350	521 971	504 911	512 136	461 275
Carpets	65 700	102 700	106 700	79 300	66 900	72 096	83 896	67 546	69 088	69 858	70 196	82 300	75 613	76 184	75 908	87 787	99 336	102 273	102 284	112 500	116 453
Tops and yarns	53 000	82 400	88 000	100 300	93 500	119 814	101 519	82 235	93 337	86 811	77 847	80 487	75 758	88 015	101 035	104 932	114 516	110 351	109 858	129 758	132 116
Other wool products						4 660	6 437	4 182	4 033	4 175	5 005	5 137	4 180	6 845	7 094	7 506	13 029	10 693	8 204	7 855	11 906
Total wool	**1 232 000**	**1 660 300**	**1 485 600**	**1 756 300**	**1 794 800**	**1 992 188**	**1 506 227**	**1 115 858**	**1 247 635**	**1 061 254**	**1 207 182**	**1 420 565**	**1 189 396**	**1 117 248**	**1 098 613**	**943 222**	**1 025 647**	**1 105 989**	**1 042 659**	**1 048 483**	**996 357**
Deer velvet						17 782	37 486	48 579	60 036	44 422	58 922	51 712	59 731	47 882	22 972	20 392	27 730	28 074	31 788	24 679	25 573
Crude animal materials	77 300	103 700	94 400	133 300	148 000	159 383	135 267	150 483	197 390	190 477	182 517	198 801	210 333	245 634	198 444	196 624	231 885	253 213	266 959	230 452	246 816
Animal oils and fats	69 800	123 800	69 000	65 000	68 000	74 975	58 605	53 563	113 544	116 869	117 751	147 595	140 669	148 289	157 533	156 771	135 633	148 323	149 487	125 958	136 402
Hides and skins	200 000	357 100	319 500	537 800	546 900	556 190	494 744	390 907	355 191	377 795	420 106	438 436	468 228	416 482	331 703	270 186	291 542	444 628	381 701	300 336	263 488
Leather	95 200	127 800	119 900	171 600	152 900	133 337	107 084	110 982	112 729	112 390	133 119	134 999	174 409	173 779	197 423	197 848	202 017	322 648	260 995	181 393	180 791
Dressed skins	6 000	9 300	11 300	11 400	14 800	57 508	74 061	81 050	113 963	125 688	139 375	125 945	142 741	136 817	119 881	111 529	99 520	127 721	145 991	109 776	104 283
Other pastoral products n.e.s.						18 911	25 745	14 639	15 916	16 433	16 256	17 539	19 743	16 922	21 944	21 324	32 258	68 015	46 293	46 111	42 714
Other pastoral exports	**448 300**	**721 700**	**614 100**	**919 100**	**930 600**	**1 018 085**	**932 992**	**850 204**	**968 771**	**984 075**	**1 068 047**	**1 115 027**	**1 215 854**	**1 185 806**	**1 049 900**	**974 673**	**1 020 584**	**1 392 621**	**1 283 213**	**1 018 705**	**1 000 067**
Total pastoral based exports	**4 872 600**	**6 407 300**	**5 662 700**	**6 853 900**	**6 907 200**	**7 872 196**	**7 478 965**	**7 177 272**	**8 248 277**	**8 015 910**	**8 752 846**	**8 595 803**	**8 791 346**	**9 287 766**	**9 531 317**	**9 493 260**	**10 356 881**	**13 914 103**	**14 062 023**	**12 024 266**	**12 603 153**
Fresh kiwifruit	125 900	171 900	294 400	432 400	443 200	455 110	474 884	437 668	455 974	334 594	381 125	320 817	406 875	376 809	429 343	473 481	458 964	594 920	618 446	538 988	658 789
Fresh apples	89 300	108 200	117 500	127 600	161 500	154 940	212 553	297 125	325 776	340 799	310 781	343 569	339 315	337 825	381 413	488 098	404 346	341 321	420 868	391 404	485 194
Onions						21 138	37 650	29 557	39 620	48 541	83 360	92 538	65 370	50 757	97 886	100 634	78 507	96 790	100 798	100 452	91 908
Squash						27 251	37 451	37 912	60 544	58 945	72 812	57 745	55 466	55 374	56 649	60 342	60 354	71 249	81 660	67 498	53 488
Wine						13 938	20 340	26 999	37 435	50 161	42 941	42 521	63 513	77 877	102 855	126 554	177 195	197 614	251 705	283 288	300 222
Other horticultural products	190 100	212 400	239 600	240 300	229 500	256 081	215 722	240 140	247 250	193 259	185 181	338 009	455 561	426 898	458 699	505 137	530 019	669 648	650 233	599 515	612 209
Total horticultural products	**405 300**	**492 500**	**651 500**	**800 300**	**834 200**	**928 457**	**998 600**	**1 069 400**	**1 166 600**	**1 026 300**	**1 076 200**	**1 195 200**	**1 386 100**	**1 325 539**	**1 526 845**	**1 754 245**	**1 709 386**	**1 971 542**	**2 123 710**	**1 981 145**	**2 201 810**
Cereals and cereal products	82 200	135 800	85 800	65 800	47 900	22 655	10 395	7 951	15 152	16 658	19 422	20 260	18 496	22 020	32 507	16 297	11 773	15 361	10 062	6 901	6 014
Eggs and honey	6 200	8 100	11 800	7 100	6 600	4 854	4 320	6 481	7 068	9 437	10 694	10 282	15 644	12 928	12 751	11 994	14 657	20 681	26 239	31 824	29 288
Meal and pet food	80 300	101 700	35 600	50 600	57 000	69 754	68 503	64 669	44 687	38 604	30 412	43 686	44 037	39 982	100 435	88 788	100 165	144 396	169 705	143 449	160 162
Other agricultural products n.e.s.	26 000	34 000	42 700	64 900	134 900	61 292	74 753	90 314	107 998	118 141	117 720	122 018	130 019	147 439	171 867	208 925	235 722	244 207	252 331	245 048	250 090
Other agricultural based exports	**194 700**	**279 600**	**175 900**	**188 400**	**246 400**	**158 554**	**157 971**	**169 415**	**174 905**	**182 840**	**178 249**	**196 247**	**208 196**	**222 369**	**317 560**	**326 003**	**362 317**	**424 644**	**458 337**	**427 223**	**445 554**
Total agricultural based exports	**5 472 600**	**7 179 400**	**6 490 100**	**7 842 600**	**7 987 800**	**8 959 207**	**8 635 536**	**8 416 087**	**9 589 782**	**9 225 050**	**10 007 295**	**9 987 250**	**10 385 641**	**10 835 674**	**11 375 722**	**11 573 509**	**12 428 584**	**16 310 289**	**16 644 070**	**14 432 635**	**15 250 518**
Total New Zealand Merchandise exports	**8 366 100**	**11 011 900**	**10 139 000**	**11 723 500**	**12 104 100**	**14 484 691**	**14 524 618**	**15 065 354**	**17 155 592**	**18 240 886**	**19 166 388**	**20 065 262**	**19 958 824**	**20 405 072**	**21 446 323**	**21 783 507**	**24 876 376**	**30 985 717**	**31 111 746**	**28 241 619**	**28 685 697**

Note:

[1] Values are New Zealand dollars free on board (FOB) and exclude re-exports.

Source: Statistics New Zealand. Table compiled by the Police Information Group, Ministry of Agriculture and Forestry.

Annex 5: Exports of Animal Products from New Zealand

Tableau 2

Exports of Animal Products from New Zealand

unit: Indice 100=1984

June Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Live animals	**100**	**132**	**189**	**252**	**310**	**349**	**319**	**295**	**307**	**284**	**302**	**232**	**229**	**207**	**231**	**236**	**291**	**253**	**261**	**244**	**300**
Beef and veal	100	150	109	161	155	202	172	202	229	223	218	183	166	156	185	172	221	264	287	245	288
Lamb	100	117	93	110	89	98	110	113	135	139	125	120	131	150	149	155	176	218	229	231	231
Mutton and hogget	100	105	98	114	99	122	109	138	137	145	133	123	159	161	156	130	135	187	216	198	203
Other meat products	100	163	138	188	434	144	144	164	199	196	205	219	228	187	180	189	227	296	289	266	347
Total meat and meat products	**100**	**131**	**102**	**133**	**130**	**143**	**137**	**153**	**178**	**181**	**171**	**156**	**159**	**163**	**172**	**169**	**201**	**250**	**265**	**245**	**266**
Butter	100	113	96	91	93	108	126	96	125	142	148	129	153	163	169	163	164	196	193	164	191
Cheese	100	109	113	117	121	136	145	152	175	211	224	256	262	355	381	417	420	539	601	424	439
Wholemilk powder	100	124	161	177	166	240	211	337	401	470	492	465	488	544	580	620	653	1136	1089	935	1011
Skimmilk and buttermilk powder	100	132	115	127	136	222	283	219	230	212	235	237	251	316	296	297	309	550	572	421	462
Casein and caseinates	100	138	130	146	154	162	211	194	209	246	263	239	262	268	307	359	379	570	551	451	367
Other dairy products	100	121	461	345	217	146	141	100	114	-2128	208	237	312	385	454	501	533	642	735	585	682
Total dairy products	**100**	**120**	**120**	**124**	**125**	**155**	**176**	**170**	**197**	**190**	**237**	**228**	**248**	**286**	**302**	**319**	**329**	**491**	**495**	**395**	**413**
Greasy wool	100	123	92	106	127	145	93	58	69	44	48	68	56	53	51	44	50	65	62	56	53
Slipe wool	100	126	111	116	185	233	182	127	149	129	131	115	121	115	122	70	74	98	58	52	57
Scoured wool	100	140	135	172	157	165	129	103	113	103	125	145	118	105	101	84	88	88	85	86	77
Carpets	100	156	162	121	102	110	128	103	105	106	107	125	115	116	116	134	151	156	156	171	177
Tops and yarns	100	155	166	189	176	226	192	155	176	164	147	152	143	166	191	198	216	208	207	245	249
Total wool	100	135	121	143	146	162	122	91	101	86	98	115	97	91	89	77	83	90	85	85	81
Crude animal materials	100	134	122	172	191	206	175	195	255	246	236	257	272	318	257	254	300	328	345	298	319
Animal oils and fats	100	177	99	93	97	107	84	77	163	167	169	211	202	212	226	225	194	212	214	180	195
Hides and skins	100	179	160	269	273	278	247	195	178	189	210	219	234	208	166	135	146	222	191	150	132
Leather	100	134	126	180	161	140	112	117	118	118	140	142	183	183	207	208	212	339	274	191	190
Dressed skins	100	155	188	190	247	958	1234	1351	1899	2095	2323	2099	2379	2280	1998	1859	1659	2129	2433	1830	1738
Other pastoral exports	100	161	137	205	208	227	208	190	216	220	238	249	271	265	234	217	228	311	286	227	223
Total pastoral based exports	**100**	**131**	**116**	**141**	**142**	**162**	**153**	**147**	**169**	**165**	**180**	**176**	**180**	**191**	**196**	**195**	**213**	**286**	**289**	**247**	**259**

Annex 6: Food Security Analysis Unit - Somalia Livestock Export Data for Somalia (Berbera)

FSU

Food Security Analysis Unit - Somalia Livestock Export Data for Somalia

Berbera: livestock export

	1 994	Jan	Feb.	Mar	ADr	May	Jun	Jul	Aua	SeD	Oct	Noy	Dee	**année 1994**	**index**
Sheep/Goats		145 277	139 116	107 102	4 548	146 433	70 160	124 105	149 756	167 321	160 414	162 991	195 433	1 572 656	
Cattle		2 836	12 393	5 838	117 257	485	138	754	2 406	8 204	9 713	7 148	6 228	173 400	
Camel		4 351	5 198	3 680	5 079	919	1 471	3 272	3 077	3 120	2 744	3 101	2 541	38 553	
Total		**152 464**	**156 707**	**116 620**	**126 884**	**147 837**	**71 769**	**128 131**	**155 239**	**178 645**	**172 871**	**173 240**	**204 202**	**1 784 609**	**100**
	1 995	Jan	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Noy	Dee	**année 1995**	
Sheep/Goats		281 200	251 547	278 406	411 368	111 575	196 218	201 284	237 160	222 224	184 707	201 555	106 353	2 683 597	
Cattle		6 960	3 963	6 082	3 342	2 123	3 431	5 217	7 533	102 629	8 444	8 659	8 745	167 128	
Camel		2 100	2 195	1 723	1 794	738	1 431	2 069	1 731	1 753	1 904	1 973	2 582	21 993	
Total		***290 260***	***257 705***	***286 211***	***416 504***	***114 436***	***201 080***	***208 570***	***246 424***	***326 606***	***195 055***	***212 187***	***117 680***	***2 872 718***	**161**
	1 996	Jan	Feb.	Mar	ADr	May	Jun	Jul	Aua	SeD	Oct	Noy	Dee	**année 1996**	
Sheep/Goats		207 638	181 414	222 631	285 091	54 174	166 072	155 980	199 275	235 946	213 022	217 153	238 250	2 376 646	
Cattle		6 998	7 190	6 598	4 861	2 992	7 358	6 276	3 195	3 915	4 792	5 471	5 481	65 127	
Camel		2 289	3 501	2 088	7 666	319	2 208	3 517	5 381	4 714	2 825	3 219	5 074	42 801	
Total		***216 925***	***192 105***	***231 317***	***297 618***	***57 485***	***175 638***	***165 773***	***207 851***	***244 575***	***220 639***	***225 843***	***248 805***	***2 484 574***	**139**
	1 997	Jan	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Noy	Dee	**année 1997**	
Sheep/Goats		328 618	208 810	487 327	219 851	145 758	151 115	248 649	157 576	162 981	110 821	257 927	335 062	2 814 495	
Cattle		9 320	3 718	6 935	3 504	5 373	9 436	4 940	5 203	3 587	3 162	4 973	6 788	66 939	
Camel		8 277	3 365	6 609	3 137	566	2 503	4 094	6 433	3 657	2 560	2 147	7 239	50 587	
Total		***346 215***	***215 893***	***500 871***	***226 492***	***151 697***	***163 054***	***257 683***	***169 212***	***170 225***	***116 543***	***265 047***	***349 089***	***2 932 021***	**164**
	1 998	Jan	Feb.	Mar	ADr	May	Jun	Jul	Aua	SeD	Oct	Noy	Dee	**année 1998**	
Sheep/Goats		338 789	108 605	43 542	41 586	39 557	19 516	44 419	65 103	29 740	49 639	59 105	117 623	957 224	
Cattle		5 899	7 002	8 813	5 219	7 746	5 037	3 757	6 301	5 586	9 742	13 049	14 062	92 213	
Camel		6 770	2 263	0	0	0	30	489	624	145	0	0	1 342	11 663	
Total		***351 458***	***117 870***	***52 355***	***46 805***	***47 303***	***24 583***	***48 665***	***72 028***	***35 471***	***59 381***	***72 154***	***133 027***	***1 061 100***	**59**
	1 999	Jan	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Noy	Dee	**année 1999**	
Sheep/Goats		115 043	220 784	116 393	32 873	34 858	177 089	200 623	193 701	141 535	219 787	248 009	347 441	2 048 136	
Cattle		11 856	7 609	5 179	4 383	4 982	7 914	6 203	7 349	8 376	6 350	9 610	10 156	89 967	
Camel		386	1 207	1 475	400	0	3 715	6 986	6 049	3 468	3 870	3 527	6 347	37 430	
Total		***127 285***	***229 600***	***123 047***	***37 656***	***39 840***	***188 718***	***213 812***	***207 099***	***153 379***	***230 007***	***261 146***	***363 944***	***2 175 533***	**122**
	2 000	Jan	Feb.	Mar	ADr	May	Jun	Jul	Aua	SeD	Oct	Noy	Dee	**année 2000**	
Sheep/Goats		378 149	489 767	231 171	25 673	34 393	102 917	125 359	144 146	69 508	0	0	0	1 601 083	
Cattle		8 140	8 900	8 119	7 052	5 673	7 712	6 686	7 996	2 985	0	0	0	63 263	
Camel		1 890	3 971	2 898	0	489	1 031	1 854	2 846	2 005	0	0	0	16 984	
Total		***388 179***	***502 638***	***242 188***	***32 725***	***40 555***	***111 660***	***133 899***	***154 988***	***74 498***	***0***	***0***	***0***	***1 681 330***	**94**
	2 001	Jan	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Noy	Dee	**année 2001**	
Sheep/Goats		0	0	0	0	5 989	2 161	2 482	8 249	3 023	4 013	14 449	11 180	51 546	
Cattle		0	0	0	0	0	2 042	1 977	1 277	1 629	2 627	4 463	6 958	20 973	
Camel		0	0	0	0	0	0	0	0	0	507	1 109	1 857	3 473	
Total		***0***	***0***	***0***	***0***	***5 989***	***4 203***	***4 459***	***9 526***	***4 652***	***7 147***	***20 021***	***19 995***	***75 992***	**4**
	2 002	Jan	Feb.	Mar	ADr	May	Jun	Jul	Aua	SeD	Oct	Noy	Dee	**année 2002**	
Sheep/Goats		26 494	46 050	28 473	6 777	150	10 378	12 861	35 233	30 089	42 261	62 549	40 396	341 711	
Cattle		4 526	3 449	2 304	849	0	1 910	1 752	2 092	1 843	4 503	5 519	8 800	37 547	
Camel		1 416	1 938	1 016	200	647	2 658	1 151	3 589	921	1 251	3 627	450	18 864	
Total		***32 436***	***51 437***	***31 793***	***7 826***	***797***	***14 946***	***15 764***	***40 914***	***32 853***	***48 015***	***71 695***	***49 646***	***398 122***	**22**
	2 003	Jan	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Noy	Dee	année 2003	
Sheep/Goats		136 211	61 046	22 655	12 035	22 871	16 502	27 306	24 817	49 863	40 262	72 819	76 720	563 107	
Cattle		10 174	5 003	3 273	1 566	2 518	3 866	15 177	3 694	7 835	7 726	9 519	13 961	84 312	
Camel		2 947	2 156	2 173	0	2 405	800	2 568	1 399	3 144	2 775	0	1 507	21 874	
Total		***149 332***	***68 205***	***28 101***	***13 601***	***27 794***	***21 168***	***45 051***	***29 910***	***60 842***	***50 763***	***82 338***	***92 188***	***669 293***	**38**
	2 004	Jan	Feb	Mar	ADr	May	Jun	Jul	Aua	SeD	Oct	Noy	Dee	**année 2004**	
Sheep/Goats		177 376	35 573	25 207	35 176	42 030	39 800	59 041	55 874	53 499	73 023	92 677	170 128	859 404	
Cattle		14 792	9 435	10 782	10 995	7 461	8 390	11 950	9 829	9 946	10 386	13 065	14 821	131 852	
Camel		0	1 018	1 250	0	625	726	0	0	1 528	0	0	0	5 147	
Total		***192 168***	***46 026***	***37 239***	***46 171***	***50 116***	***48 916***	***70 991***	***65 703***	***64 973***	***83 409***	***105 742***	***184 949***	***996 403***	**56**
	2 005	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Noy	Dee	**année 2005**	
Sheep/Goats		130 231	60 556	19 749	45 458	54 799	36 335	67 537	75 918	54 266	142 554	119 982	216 410	1 023 795	
Cattle		14 695	11 303	12 934	8 650	8 174	7 437	8 693	10 698	8 643	17 547	15 760	23 617	148 151	
Camel		0	0	0	1 068	0	477	1 131	328	446	335	308	976	5 069	
Total		***144 926***	***71 859***	***32 683***	***55 176***	***62 973***	***44 249***	***77 361***	***86 944***	***63 355***	***160 436***	***136 050***	***241 003***	***1 177 015***	**66**
	2 006	Jan	Feb	Mar	ADr	May	Jun	Jul	Aua	SeD	Oct	Noy	Dee	**année 2006**	
Sheep/Goats		99 956	56 053	86 187	66 784	67 553	56 919	88 887	76 096	65 451	105 543			769 429	
Cattle		9 142	8 628	6 020	4 005	3 942	3 803	8 807	7 782	6 671	8 373			67 173	
Camel		563	1 884	4 170	4 384	876	1 703	1 023	2 286	2 404	1 451			20 744	
Total		***109 661***	***66 565***	***96 377***	***75 173***	***72 371***	***62 425***	***98 717***	***86 164***	***74 526***	***115 367***			***857 346***	**48**

Annex 7: Food Security Analysis Unit - Somalia Livestock Export Data for Somalia (Bossasso)

Food Security Analysis Unit - Somalia Livestock Export Data for Somalia

Bossasso: livestock export

Mar	ADr	May	Jun	Jul	Aua	SeD	Oct	Noy	Dee	**année 1994**	**index**
32 000	36 000	12 000	26 000	22 000	31 000	18 000	15 000	20 000	15 000	344 000	
380	-	-	-	-	-	-	-	310	90	1 450	
460	400	700	320	190	230	560	1 390	200	97	5 397	
32 840	***36 400***	***12 700***	***26 320***	***22 190***	***31 230***	***18 560***	***16 390***	***20 510***	***15 187***	***350 847***	***100***
Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Noy	Dee	**année 1995**	
36 051	29 000	24 870	22 000	43 850	56 355	59 050	63 000	58 930	56 260	524 346	
730	990	420	300	650	800	900	900	640	875	8 795	
438	500	330	220	480	650	674	1 150	1 050	1 850	8 392	
37 219	***30 490***	***25 620***	***22 520***	***44 980***	***57 805***	***60 624***	***65 050***	***60 620***	***58 985***	***541 533***	***154***
Mar	ADr	May	Jun	Jul	Aua	SeD	Oct	Noy	Dee	**année 1996**	
90 240	98 923	5 680	26 760	38 430	45 130	31 247	22 948	43 703	67 140	614 407	
940	710	280	1 045	270	344	5 159	625	637	2 416	15 335	
2 780	5 656	400	529	998	847	91	701	843	1 495	20 462	
93 960	***105 289***	***6 360***	***28 334***	***39 698***	***46 321***	***36 497***	***24 274***	***45 183***	***71 051***	***650 204***	***185***
Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Noy	Dee	**année 1997**	
48 685	49 753	21 945	20 770	35 815	39 449	34 465	19 390	21 230	31 225	494 320	
410	70	465	1 724	1 657	3 626	2 117	526	1 680	2 671	17 831	
2 737	965	244	615	1 533	654	2 268	750	580	1 455	14 599	
51 832	***50 788***	***22 654***	***23 109***	***39 005***	***43 729***	***38 850***	***20 666***	***23 490***	***35 351***	***526 750***	***150***
Mar	ADr	May	Jun	Jul	Aua	SeD	Oct	Noy	Dee	**année 1998**	
84 990	13 930	25 540	28 050	36 900	37 650	38 400	41 910	48 550	85 800	517 020	
2 400	1 713	1 990	2 740	2 850	3 230	2 610	1 440	2 120	4 250	29 492	
0	0	120	200	835	250	90	0	0	0	3 938	
87 390	***15 643***	***27 650***	***30 990***	***40 585***	***41 130***	***41 100***	***43 350***	***50 670***	***90 050***	***550 450***	***157***
Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Noy	Dee	**année 1999**	
62 901	30 200	22 908	36 307	49 129	45 945	30 003	42 038	73 177	116 085	633 669	
1 000	1 077	1 724	3 928	2 667	4 324	4 324	3 029	4 518	3 928	36 586	
199	0	0	865	4 740	1 630	2 494	2 104	1 512	1 684	15 544	
64 100	***31 277***	***24 632***	***41 100***	***56 536***	***51 899***	***36 821***	***47 171***	***79 207***	***121 697***	***685 799***	***195***
Mar	ADr	May	Jun	Jul	Aua	SeD	Oct	Noy	Dee	**année 2000**	
73 170	31 010	23 750	39 640	51 830	43 400	24 900	0	0	0	571 455	
1 360	2 989	885	2 390	7 213	4 110	1 955	0	0	0	27 604	
875	238	452	810	1 908	1 650	190	0	0	0	8 177	
75 405	***34 237***	***25 087***	***42 840***	***60 951***	***49 160***	***27 045***	***0***	***0***	***0***	***607 236***	***173***
Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Noy	Dee	**année 2001**	
0	0	13 100	13 415	39 660	40 600	93 963	87 864	137 750	121 401	548 853	
0	0	1 300	3 580	7 479	17 710	2 114	2 615	4 205	3 245	42 248	
0	0	0	0	0	0	0	0	600	750	1 950	
0	***0***	***14 400***	***16 995***	***47 139***	***58 310***	***96 077***	***90 479***	***142 555***	***125 396***	***593 051***	***169***
Mar	ADr	May	Jun	Jul	Aua	SeD	Oct	Noy	Dee	**année 2002**	
102 948	39 780	85 310	109 900	121 490	113 300	69 308	150 845	160 245	100 154	1 412 450	
3 977	4 250	3 470	5 470	7 610	7 740	3 864	4 448	3 433	3 773	53 313	
785	1 183	744	883	820	170	650	782	765	1 300	9 720	
107 710	***45 213***	***89 524***	***116 253***	***129 920***	***121 210***	***73 822***	***156 075***	***164 443***	***105 227***	***1 475 483***	***421***
Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Noy	Dee	année 2003	
91 725	89 655	116 058	117 476	129 100	113 098	110 380	161 795	112 132	114 890	1 483 409	
9 013	5 185	3 098	6 590	3 153	6 278	8 879	10 250	5 873	3 953	71 328	
1 020	145	389	677	0	28	618	160	8	514	4 259	
101 758	***94 985***	***119 545***	***124 743***	***132 253***	***119 404***	***119 877***	***172 205***	***118 013***	***119 357***	***1 558 996***	***444***
Mar	ADr	May	Jun	Jul	Aua	SeD	Oct	Noy	Dee	**année 2004**	
74 257	98 780	106 040	79 150	126 295	59 060	75 805	72 660	70 455	95 817	1 166 480	
11 842	4 766	6 439	9 670	5 904	4 050	7 945	7 418	3 225	5 750	79 994	
175	478	66	466	479	120	85	100	60	308	2 488	
86 274	**104 024**	**112 545**	**89 286**	**132 678**	**63 230**	**83 835**	**80 178**	**73 740**	**101 875**	**1 248 962**	***356***
Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Noy	Dee	**année 2005**	
98 207	97 120	85 550	112 606	118 613	98 140	156 730	193 442	140 318	269 979	1 594 859	
8 740	6 429	6 868	9 069	5 232	7 340	11 974	6 544	5 472	10 366	91 910	
1 087	600	50	1 853	1 581	3 898	3 875	1 221	2 633	9 164	26 109	
108 034	***104 149***	***92 468***	***123 528***	***125 426***	***109 378***	***172 579***	***201 207***	***148 423***	***289 509***	***1 712 878***	***488***
Mar	ADr	May	Jun	Jul	Aua	SeD	Oct	Noy	Dee	**année 2006**	
95 220	119 872	127 880	113 710	183 040	118 470	173 430	177 100			1 276 137	
6 183	7 059	5 939	11 905	11 900	12 645	9 605	7 538			90 104	
8 450	7 045	1 074	861	988	1 790	1 200	1 690			32 377	
109 853	***133 976***	***134 893***	***126 476***	***195 928***	***132 905***	***184 235***	***186 328***			***1 398 618***	***399***

Annex 8: Food Security Analysis Unit - Somalia Livestock Export Data for Somalia - Synthesis

Tableau 5

Food Security Analysis Unit - Somalia Livestock Export Data for Somalia

units: head of animals and Index

		Berbera	Bossasso	Total	indice
	1 994				
Sheep/Goats		1 572 656	344 000	1 916 656	
Cattle		173 400	1 450	174 850	
Camel		38 553	5 397	43 950	
Total		**1 784 609**	**350 847**	**2 135 456**	**100**
	1 995				
Sheep/Goats		2 683 597	524 346	3 207 943	
Cattle		167 128	8 795	175 923	
Camel		21 993	8 392	30 385	
Total		**2 872 718**	**541 533**	**3 414 251**	**160**
	1 996				
Sheep/Goats		2 376 646	614 407	2 991 053	
Cattle		65 127	15 335	80 462	
Camel		42 801	20 462	63 263	
Total		**2 484 574**	**650 204**	**3 134 778**	**147**
	1 997				
Sheep/Goats		2 814 495	494 320	3 308 815	
Cattle		66 939	17 831	84 770	
Camel		50 587	14 599	65 186	
Total		**2 932 021**	**526 750**	**3 458 771**	**162**
	1 998				
Sheep/Goats		957 224	517 020	1 474 244	
Cattle		92 213	29 492	121 705	
Camel		11 663	3 938	15 601	
Total		**1 061 100**	**550 450**	**1 611 550**	**75**
	1 999				
Sheep/Goats		2 048 136	633 669	2 681 805	
Cattle		89 967	36 586	126 553	
Camel		37 430	15 544	52 974	
Total		**2 175 533**	**685 799**	**2 861 332**	**134**
	2 000				
Sheep/Goats		1 601 083	571 455	2 172 538	
Cattle		63 263	27 604	90 867	
Camel		16 984	8 177	25 161	
Total		**1 681 330**	**607 236**	**2 288 566**	**107**
	2 001				
Sheep/Goats		51 546	548 853	600 399	
Cattle		20 973	42 248	63 221	
Camel		3 473	1 950	5 423	
Total		**75 992**	**593 051**	**669 043**	**31**
	2 002				
Sheep/Goats		341 711	1 412 450	1 754 161	
Cattle		37 547	53 313	90 860	
Camel		18 864	9 720	28 584	
Total		**398 122**	**1 475 483**	**1 873 605**	**88**
	2 003				
Sheep/Goats		563 107	1 483 409	2 046 516	
Cattle		84 312	71 328	155 640	
Camel		21 874	4 259	26 133	
Total		**669 293**	**1 558 996**	**2 228 289**	**104**
	2 004				
Sheep/Goats		859 404	1 166 480	2 025 884	
Cattle		131 852	79 994	211 846	
Camel		5 147	2 488	7 635	
Total		**996 403**	**1 248 962**	**2 245 365**	**105**
	2 005				
Sheep/Goats		1 023 795	1 594 859	2 618 654	
Cattle		148 151	91 910	240 061	
Camel		5 069	26 109	31 178	
Total		**1 177 015**	**1 712 878**	**2 889 893**	**135**
10 premiers mois	**2 006**				
Sheep/Goats		769 429	1 276 137	2 045 566	
Cattle		67 173	90 104	157 277	
Camel		20 744	32 377	53 121	
Total		**857 346**	**1 398 618**	**2 255 964**	**106**